THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XC. No. 2187.] LONDON, APRIL 11, 1905. [57TH YEAR. PRICE 6d.

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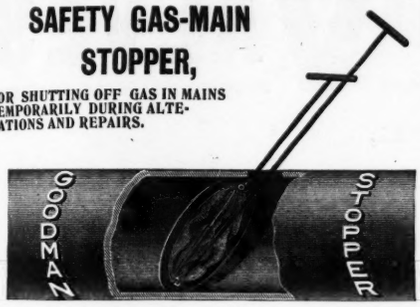

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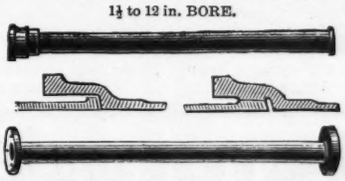

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TO THE EDITOR OF ENGINEERING.

SIR,—Some years ago we attached forced draught and special fire-bars to our two Lancashire boilers, with the object of burning coke dust. The load has grown, and last week I had the water and fuel carefully checked, with the following results:—

Water used in boilers from Dec. 9 to Dec. 16, as per Corporation meter .	79,300		
Fuel used from Dec. 9 to Dec. 16: Coke	£	s.	d.
dust—41 tons 4 cwt., at 1s. 11d. .	3	19	0
Washed slack—15 tons 17 cwt., at 6s. 6d.	5	3	2
	£9	2	2

This works out at a fraction under 2s. 4d. per 1000 gallons. Can this result be beaten? I may add that the water-feed to the boilers is heated by the exhaust steam from the engines to 200 deg.

Yours truly,
C. D. LENG.

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Fig. 705. "SINGLE RAM" STEAM-PUMP.

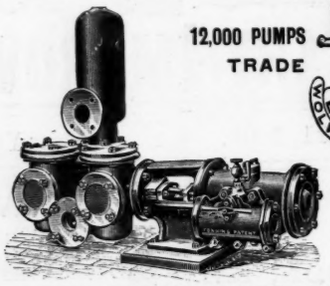

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

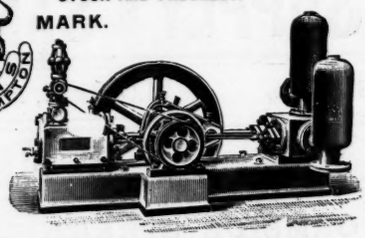

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

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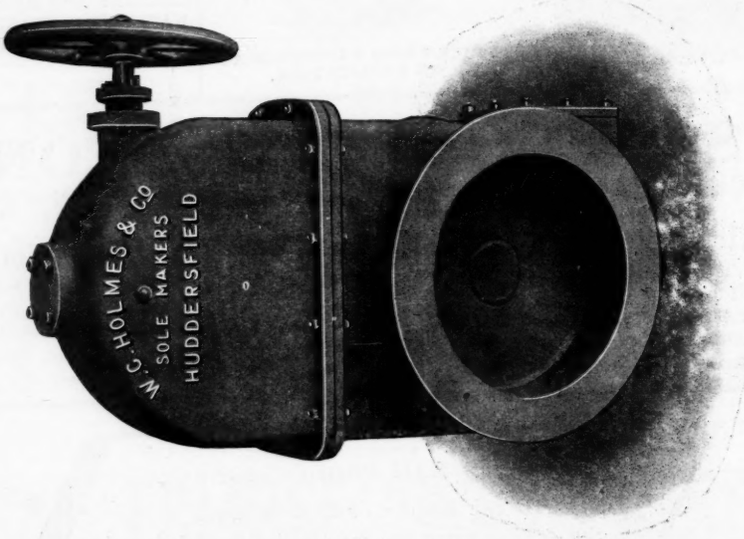

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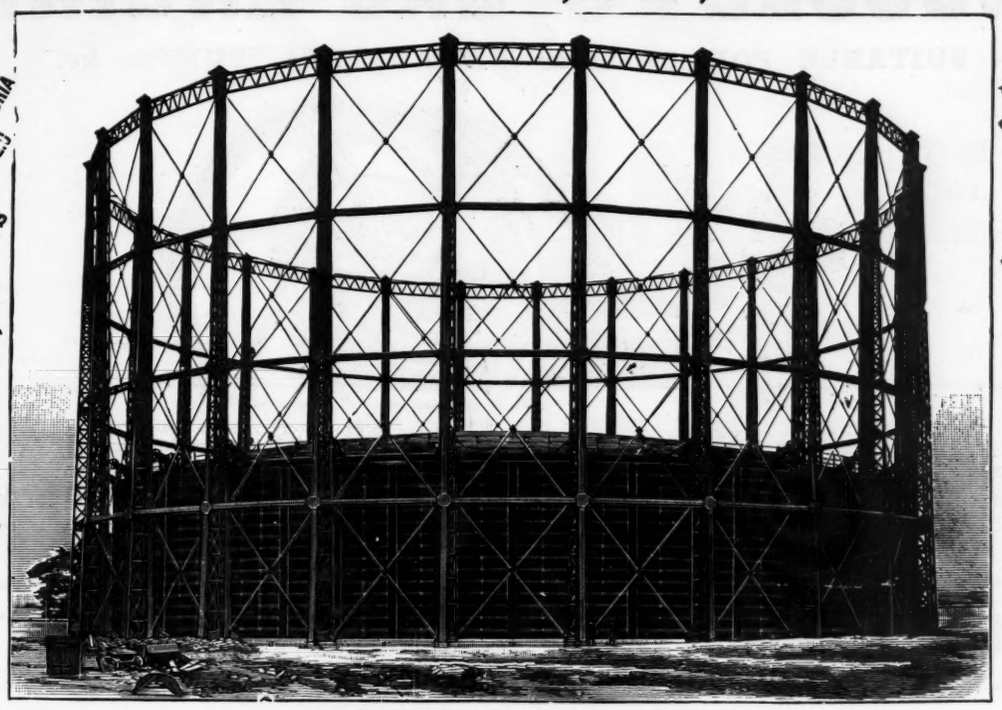

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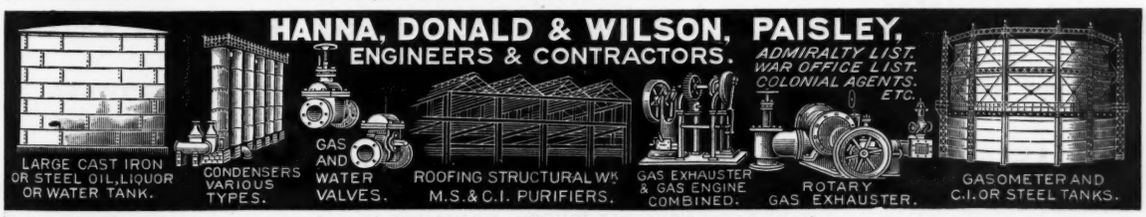
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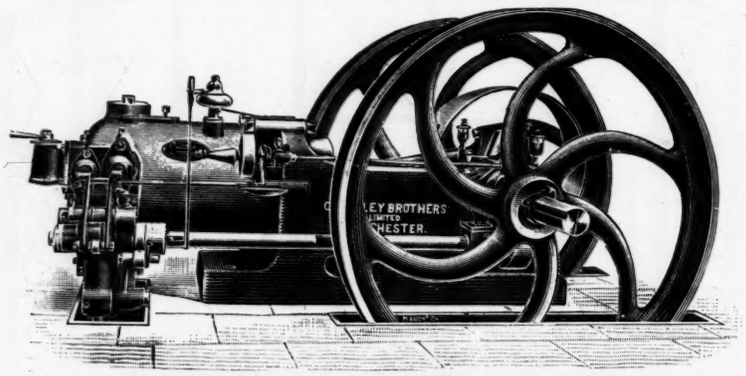

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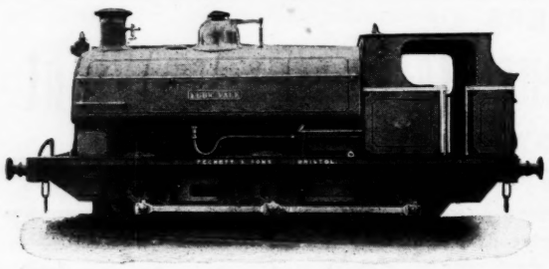

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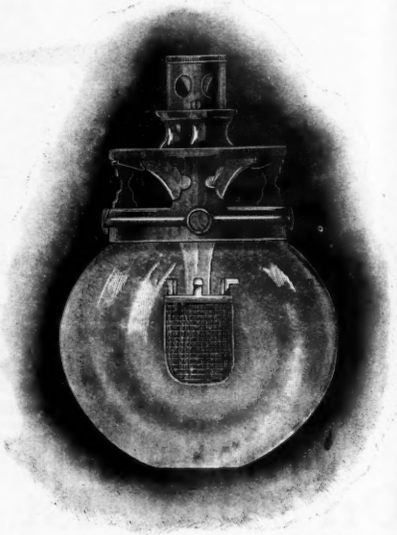

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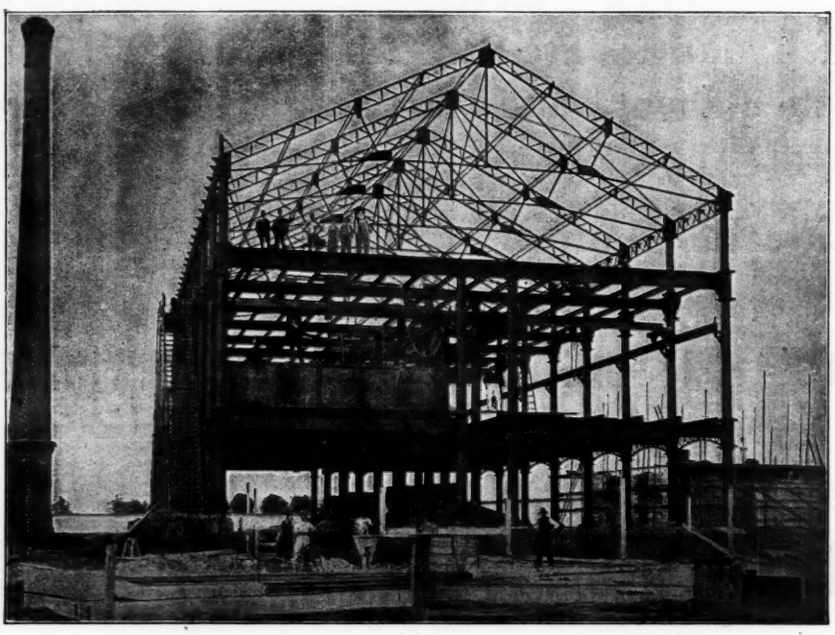

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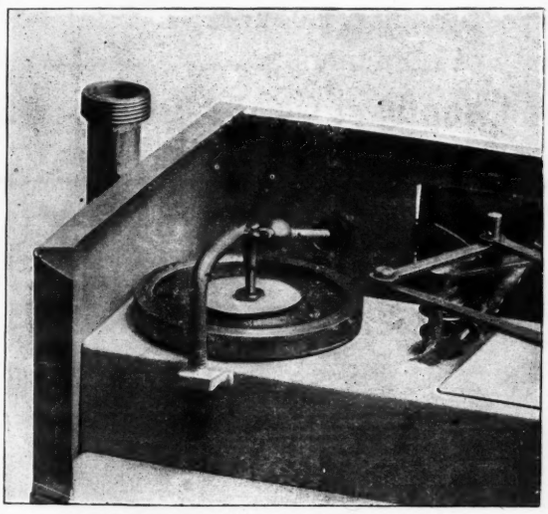

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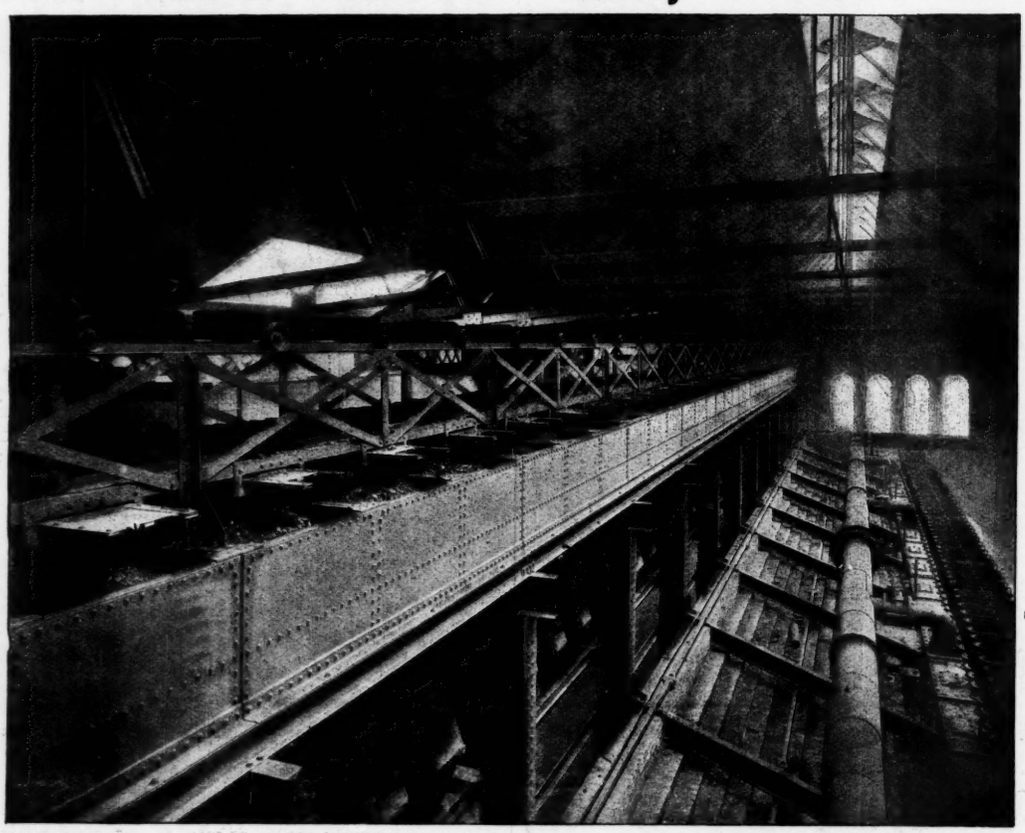

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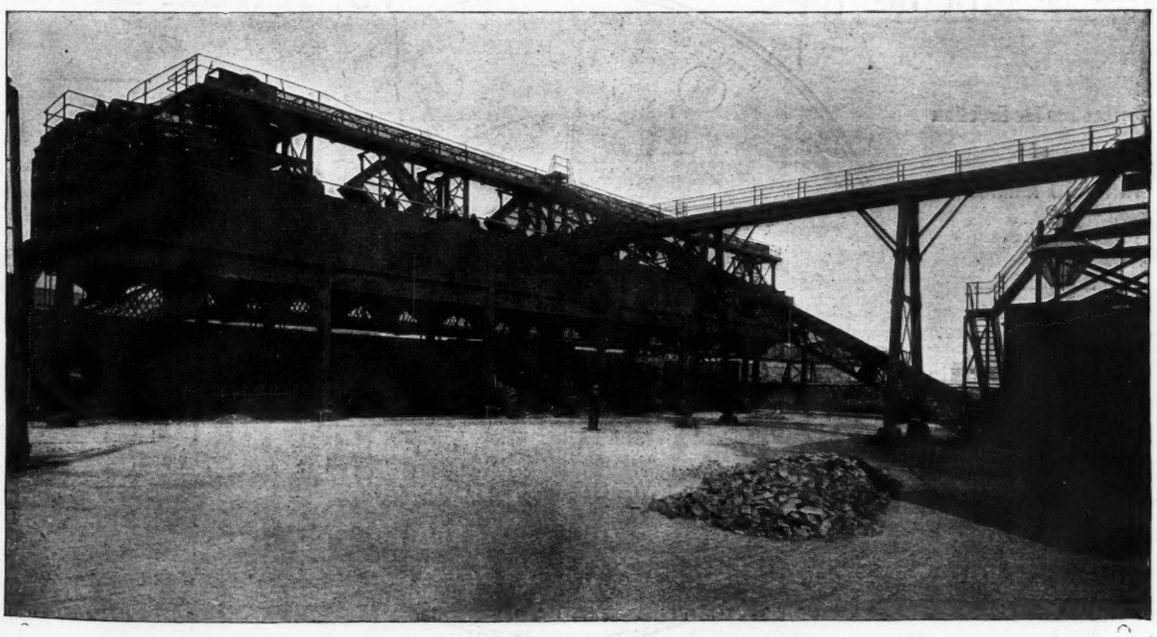

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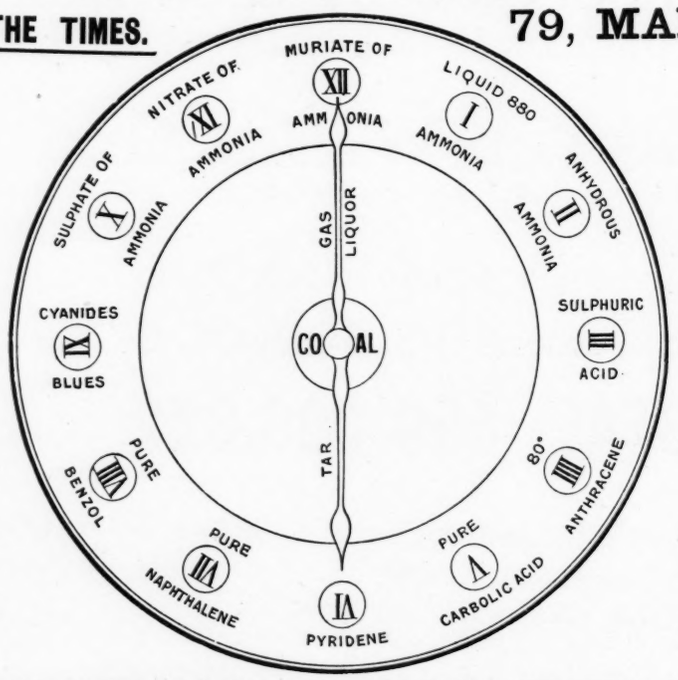

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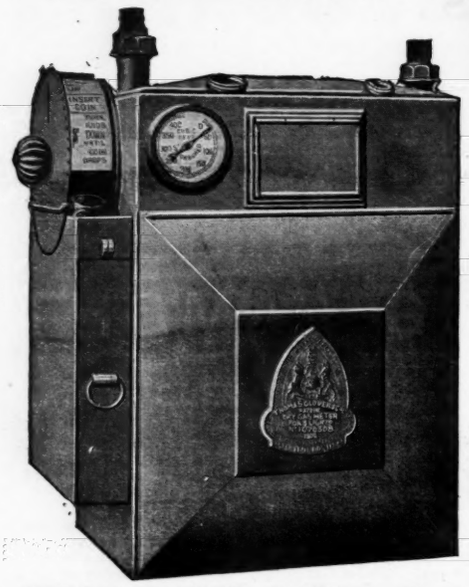

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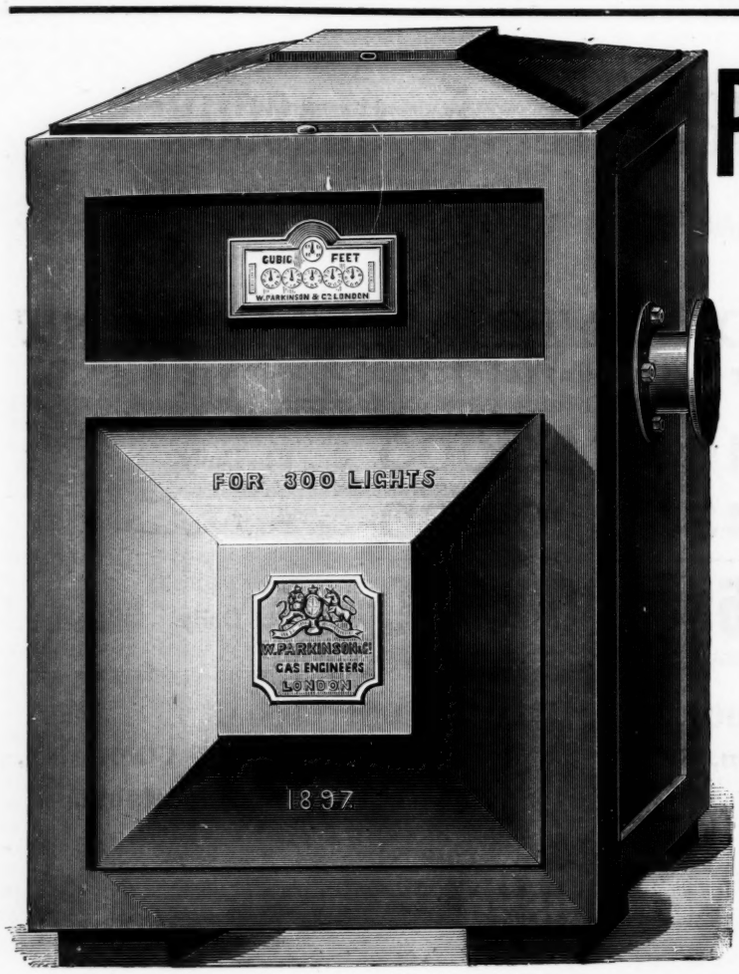

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EDITORIAL NOTES—GAS, &c.

Gas Testing for the Metropolis.

THIS subject still engrosses attention, and must continue to do so until the question of the rate of burning is settled in conformity with the dictates of justice and common sense. It is a satire upon present-day science that a discussion such as that which is now agitating the gas industry should be at all possible. It is so manifestly unfair and unscientific to measure the quality of illuminating gas by means which are admittedly defective, that the more the recommendation of the Departmental Committee to revert to the 5 cubic feet rate of consumption is considered, the greater becomes the wonder that any body of jurists, scientific or otherwise, could have committed themselves to such an irrational and illogical proposition. Seeing that, as was so clearly pointed out by Dr. Colman in the last number of the "JOURNAL," the main point at issue —namely, whether or not the two Companies supplying 14-candle gas should be compelled to supply a gas of actually higher illuminating value—was decided against the London County Council, what object could there be in disturbing the existing method of testing as prescribed by the South Metropolitan Company's Act of 1900? How is anyone to be the gainer by a mere alteration of nomenclature from 14 to 13 candle gas? And if nothing is to be gained by a change, why should a change be made? In this case, however, not only is nobody to be a gainer by the change proposed, but the position of the Companies must become distinctly worse. The injustice that may be done by adherence to the 5-feet rate of consumption is proved to demonstration by the diagram prepared by Mr. W. J. Dibdin giving the results of an extremely careful series of experiments made by him with various qualities of gas; and this has raised a point which was not gone into before the Departmental Committee. To do Mr. Cawley's Committee justice, they did endeavour to meet this by prescribing that an average of three days' testing should be taken; but this does not, and cannot, meet the objection of the Companies to the placing of an erroneous value upon the gas which they supply. That they will use their best endeavours in the House of Lords to obtain a reversal of the decision of the Commons Committee, may be regarded as certain; but it hardly needs to be said that they will require all the support they can obtain in a struggle which is of the utmost moment to the gas industry generally.

As was seen from the letter published last week from Mr. Irving, the President of the Institution of Gas Engineers, the matter is to engage the attention of the Institution at their annual meeting in June. This, however, may be too late to exercise any influence in the present contest, as it is probable that the London Gas Bill will be before the Lords' Committee shortly after Easter. It is therefore desirable that action should be taken by the Council of the Institution as promptly as possible; and it is certain that in anything they may decide to do, they will have the support of the members. A further memorial to the Board of Trade, pointing out the profound dissatisfaction felt by the gas industry at the course which legislation is taking, and the disastrous effect of the latter, as already instanced by the withdrawal of the proposals in regard to illuminating power of the South Suburban Company, might have the desired effect of awakening in that body a sense of its neglect of the Council's memorial on the subject of November last. There is good reason for believing that some such action on the part of the Council would be thoroughly approved by the members.

In the discussion to which this absurd recommendation of the Departmental Committee has given rise, it is but natural that various views should have been expressed as to what should be the alternative to the 5 cubic feet rate of consumption, having regard, not only to the merits of the question, but also to what may be advisable on the ground of expediency. Should the Companies take their stand on the provisions of the South Metropolitan Company's Act of 1900, or upon the later proposal for a 3½-inch height of flame; or should they ask for a re-enactment of the clause in the 1868 Act which enjoins upon the Gas Referees the duty of selecting for testing purposes a burner that shall best develop the illuminating power of the gas, and be suitable for use by the consumer? As regards the latter suggestion, it is assumed that the re-enactment of such a provision would compel the Gas Referees to prescribe a more suitable burner for 14-candle gas than the No. 1 "London" argand; but it also implies the necessity of prescribing a different burner for each quality of gas. This, we venture to say, is not correct; nor can it be desirable, in the interests of uniformity, to multiply standard test-burners. What the gas industry so greatly desires to see is the establishment of a system of testing that shall give, practically speaking, comparable results for all qualities of common gas; and this would be as far off from accomplishment as ever if a separate burner had to be prescribed for each quality. On the mere ground of expediency, the Gas Companies would probably have had an easier task had they adhered to the 16-candle illumination, as prescribed by the South Metropolitan Company's Act of 1900. But this is a matter which now concerns them all; and for the varying compositions of the gas which they supply, the 3½-inch height of flame is evidently the most suitable. This, moreover, is the method which has found favour with the Institution of Gas Engineers as one which, in the words of the memorial to the Board of Trade, "would afford the means of comparing, on "practically equal terms, gas of varying qualities made in "any part of the kingdom; and it would consequently be "a definite and satisfactory settlement of this much-vexed "question." For these weighty and cogent reasons, it may be confidently anticipated that the London Gas Companies will take a firm and united stand upon this proposal, in regard to which practically the entire gas industry is with them.

Where the Bermondsey Clause Fails.

GREAT was our admiration of the Bermondsey clause when in 1902 it found birth in the Bermondsey Electric Lighting Order at the instance of the South Metropolitan Gas Company. Time, the infallible test of most things, has unfortunately proved its failure in one respect, and in—being the very place of its nativity—a conspicuous manner, it must with all humility be confessed, at Bermondsey. However, because, let us hasten to say, it has not compassed in a complete manner its one and only object—the defence of the ratepayers—it has done so to an extent, but at the expense of the ratepayers; and we will say this for the clause, that, had it not been in existence, things might have been disagreeably worse. Where the deficiency of the Bermondsey clause in the one particular arises, its successor the Northumberland clause partially makes provision; but, as we shall now show, not entirely so. Therefore, notwithstanding that the later clause does not completely safeguard the ratepayers from extravagance in connection with municipal electric lighting, there should be no abatement of the request for its application.

The original Bermondsey clause was designed to ensure that proper business principles should obtain in the conduct of municipal electricity supply, for reasons which have been stated over and over again. The clause, it will be remembered, provided "that the undertakers shall fix "annually the charges to be made for the supply of energy "in the then ensuing year at such rates (not exceeding the "maximum rates specified in the Order), so that, as far as "is reasonably practicable, the revenue of that year shall not "be less than the expenditure for that year." The clause has superficially effected its purpose in Bermondsey; for there was a net profit on the undertaking for the financial year ending March, 1904 (the latest accounts, of course, available),

of £512. So that the undertaking in this sense did not come upon the rates for support. But almost immediately after the clause had been safely established in the Order, it was recognized that it did not go far enough, and left a big loop-hole for its evasion; and in "Gleanings from the Committee "Rooms" on July 15, 1902, it was pointed out that the ratepayers of Bermondsey might have to suffer by the public electric lighting being charged up to the maximum for electricity. In the event, it is found that, though the ratepayers have not been charged up to the maximum per unit for their public lighting, the average paid per unit for the current used in the streets is greater than the average price per unit charged for all the private supplies lumped together; and not only in this way, but through a system of wastefulness in respect of public lighting, over which system the ratepayers have no control, they have had to contribute dearly to the support of electric lighting undertaking. To operate against the artifice of utilizing the public lighting as a means of circumventing the intention of the Bermondsey enactment, the Northumberland clause of last year embraced a most useful provision, which stipulates: "There shall not be made "against the borough rate in respect of street lighting "or other municipal purposes for which energy shall be "employed a charge at any higher rate than that charged "to consumers using energy for similar purposes, and for "the like hours of supply." This obviates an excessive charge per unit for public lighting; but it does not prevent the illumination of the streets by a wasteful method, and to extravagant quantity and extent. In both these respects, the Bermondsey clause is deficient; in the latter respect only, do the Northumberland clause fails. In most places, where electricity supply is a municipal undertaking, the public lighting is used to prop it up at the cost of the ratepayers, and to their growing dissatisfaction, as witness the recent revelations, to which reference has been made in our "Electric Lighting Memoranda."

To return to Bermondsey. That the electricity undertaking has not brought to the borough all that was expected of it, as was feared would be the case by the South Metropolitan Gas Company, is causing some irritation among the ratepayers; that matters are not worse than they are, the ratepayers ought to thank the Gas Company. Bermondsey, as it has been well put, is now feeling a bit sorry for itself. The trouble is, of course, all over the amount that has to be paid for street lighting. Not only is the public lighting charged for at the rate of 3d. per unit, as against the average of 2·88d. per unit received for the remainder of the business done by the department, but the total cost of street lighting has gone up by some 50 per cent. more than it was in 1901 when gas was the sole illuminant. In that year the amount expended on street illumination was £6819; this year, the cost with electric light in vogue (a year ago there were 170 arc lamps and 381 incandescents in use) is £9920; and for next year the estimate is £10,252. Therefore, in the five years, the cost will have increased by £3433. That is where the Bermondsey clause has failed; for it is obvious that, were it not for this heavy tax upon the ratepayers' pockets in this branch of municipal expenditure, the electricity undertaking would show a loss. What, therefore, has it profited the ratepayers of Bermondsey to gain an electric lighting undertaking, and to lose from their pockets 50 per cent. of the former cost of the public lighting? Those of their representatives who recognize the injustice have urged in the Council Chamber that the price charged for public lighting shall not be more per unit than that paid by other large consumers. This is one respect in which the Northumberland clause is an improvement upon the original Bermondsey clause; inasmuch as it obviates the infliction of a higher charge for electricity used for street purposes than that required of other large customers. But the higher claim of the ratepayers of Bermondsey to at all events equality with the largest of the private consumers has been rejected by a majority of councillors who know that—and knowing, fear their electricity consuming constituents—the lowering of the price for public lighting would necessarily mean an increase of price to the private consumer. The cry of extravagance in this matter is loud and frequent, and is now getting fairly general. Whatever the Northumberland clause which has replaced the Bermondsey clause can effect in impeding municipal indiscretion in the management of local affairs, it cannot prevent the substitution—to any extent the Council in their lavishness choose to order—of a cheap and an efficient means of lighting by one which bears most immoderately upon the ratepayers.

The Rebellion of the Ratepayer.

Turbulent times are coming on the municipalities of the country. The growing burden of the rates everywhere has at last stirred the ratepayers from a state of inaction and indifference into one of wrathful expostulation. Sir Albert Rollit the other day was telling the Association of Municipal Corporations that the past year had seen spasmodic attacks on municipalism, and that municipally the year and parliamentary session had been dull. When twelve months hence he again reviews the municipal year, his story, if it be truthfully told, will be less cheerfully toned. Sir Albert, however, as a rhetorician, has a very happy way of putting the most ugly of municipal deformities into meretricious dress; and even the general remonstrance of to-day against municipal extravagance may be treated by him in that flippant manner which is pleasing to the present much-vexed ears of the local-governing bodies. He has described the policy of the municipalities as "philosophical and plain;" but the majority of those who have to pay for that policy are of opinion that "plainly philosophistical" would have been a more apt description. Returns have been issued which show the terrible accumulation of municipal debt in London; and what has happened in London has its proportional like in most of the cities and towns in the country. By that debt, the heaviness of the rates, and the benefits realized, the ratepayers are judging the policy of the so-called progressive local government of the times; and it is being found lamentably wanting.

There is talk of a conference over the matter in London, in order to make a move in urging the necessity for regulating the basis of expenditure. It is recognized that the time has come for something to be done; but what that something should be, no one has any clear notion. The curtailing of municipal trading where private enterprise can equally well serve a community without committing the ratepayers to enormous expenditure and obligation, is one method. The growth of the rates has, to name an example, called more prominent attention than ever before to the outrageous increase of the cost of public lighting since municipalities have become vendors of electricity; and that value for the expense entailed is not being obtained in this direction is patent to most people who interest themselves in the matter. The public lighting has been an excellent customer to the municipal electricity undertaking—a customer that has had the convenient manner with him of not opening his mouth in protest at the constantly increasing total of his account. Another method of restriction is the reduction of the repayment period for municipal loans. If this is done, the ratepayers of the day will not long continue to put up with the spendthrift policy of their local governors, but will bind them down to their legitimate sphere of operation. The orators of municipalism call this proposition, and the present action of the Local Government Board in confining loans to shorter terms, an act of injustice to the present generation and a concession to posterity. The municipalities have had plenty of indulgence and rope in the past; and what has come of it? Simply the blighting burden of rates under which the private individual and the industry are both alike now groaning. And save in such matters as permanent necessities—water supply, sanitary requirements, and so forth—what right have we of this generation to burden posterity with the costs of "improvements" (to give them the common and favoured title) enjoyed to-day which may be superseded hereafter, and will not be regarded by posterity as we regard them now? In the light of past experience, it is senseless to protest against this shortening of the terms for loans. The Local Government Board have had of late years too many instances of extravagance in schemes, and of money spent on expensive plant that has been far from paid off and yet unprovided for when the plant has seen its last days of useful or economic service, not to know what they are now about. The Association of Municipal Corporations have passed a resolution pointing out to the Board that the granting of short loans is imposing an unfair burden upon the present ratepayers. The Board, we hope, will be wise enough to see that it will not impose a greater burden than the thriftless policy which longer loans permit. And perhaps Sir Albert Rollit will find something "philosophical and plain" in a remark dropped in his hearing by Mr. Gerald Balfour, that "presently a limit on muni-"cipal trading would be imposed by the nature and neces-"sity of the case." The prayer of the ratepayers will be that Parliament will continue to make the "nature and

"necessity of the case" as actively instrumental as possible, so as to bring home quickly the gravity of the responsibility that rests upon municipalities. The more some of them are allowed to continue to recklessly "improve," the greater the injury to those living within range of their jurisdiction.

The ways of increasing the burden of the ratepayer are many. We have before us in London the quinquennial valuations; and property owners are not looking forward to it with anything like complacent feelings. The authorities will not let slip any means of grabbing additional revenue; and therefore we may expect to see some serious fighting over assessments, more especially by the large companies. Nemesis, however, already shadows the local authorities in more directions than one. A correspondent of a daily contemporary states that the Midland Railway Company have, within the last week or so, in consequence of the increasing competition of the municipal electric tramways, compelled the Bradford authorities to reduce the assessment of their lines in the city by £3000, thereby saving an annual contribution to the rates of £1250. This sum, instead of coming from one source as hitherto, will now have to be spread over the whole of the ratepayers. If the tramways had been private property, this loss from the Railway Company would have come upon them, and not the ratepayers as a whole. It is, however, a sign of what will happen to a still larger extent in the future with municipal trading and competition rampant.

The Informal Meeting of Scottish Gas Managers.

This gathering, which attained its majority a year ago, has, if we are to judge by the meeting which was held in Glasgow last Wednesday, entered upon a career of even greater prosperity than it has ever hitherto enjoyed, though this has been by no means small. At no previous meeting has the number of managers in attendance been so large; and at none has a discussion so prolonged or so spontaneous been experienced. The meeting this year was held under an eclipse, for Mr. J. M'Gilchrist, of Dumbarton, the founder of the "Informal Meeting," and its mainstay all along, was unfortunately, through ill-health, obliged for the first time to send a letter of apology for absence. The message, it is almost needless to say, was received with that sympathy which it deserved; and a reply in a reciprocating spirit was sent, which probably went some way to console him, in his, it is to be hoped, only temporary retirement. As to the meeting itself, it might be said to have been conducted without a Chairman. The truest art is to conceal art; and while Mr. J. Napier Myers, of Saltcoats, was President, and occupied the chair, he so engineered affairs that, except for his opening and closing remarks, his intervention was never required. One reason for this state of matters is doubtless to be found in the nature of his Presidential Address. In it there will be found more than a dozen topics of interest taken up, touched upon, and, after a common-sense remark or two upon them, passed on. The effect of this policy was that every speaker had a profusion of subjects upon which to base his remarks. This to some extent accounted for the volubility of the meeting; but there was more, because account must be taken of what was described as the characteristic nature of the address. Mr. Myers is a hard worker, but he is not a plodder; he is a higher critic.

Though the address was nominally upon small things, some of the matters dealt with were not small in point of importance, but were of importance to small works, on account of their far-reaching application. It is needless to specialize upon this aspect of the address, as it speaks for itself. But notice ought to be taken of Mr. Myers's proposal to limit the range of error allowed in the gas-meters. Reasons were given for the change; and these have great weight. There are reasons on the other side, some of which were suggested at the meeting; but the time for discussion upon the merits is not quite yet. What Mr. Myers asks is that some of the organized bodies of gas engineers should take up the subject. It was from Mr. Myers that the idea of the standardization of meter-unions came; and this latest proposal points to the fact that his faculty for suggestions of the first water is still in exercise. He has no favour for the prepayment meter; but here, again, his thoughts do not dwell upon the workshop or the cash-desk view of the subject, but upon the wider view of the meter being an evidence of the deterioration of the race. If the poor were not improvident, they would be able to pay their gas bills as their betters have been accustomed to pay for all the commodities they purchase. This appears to be Mr. Myers's argument. He had no support in it; and the most that can be said in favour of his position is that if the poor could be induced to greater thrift, and be thereby raised to a higher standard of living, by the use of the prepayment meter, then he would withdraw his ban of it, and willingly allow it to be regarded as an invention on the side of benevolence. A prepayment gas-meter as a social missionary is a new view; and it may not really be so far-fetched as at first sight it appears to be. Should it become so in reality, no one will cavil at the result. It is good that optimism like that of Mr. Myers should be aired now and then. His address was full of thoughtful suggestions, for which he will receive the thanks of many. It laid the foundation of an excellent meeting; and on this score he deserves hearty congratulations.

Corrupt Practices.

The trial and sentence last Thursday of the ex-Town Clerk of Holborn for stealing and appropriating moneys belonging to the borough, brought into prominence certain practices which have from time to time been denounced in the "Journal." Among these, the condition which it has been the custom of certain corporations and companies to impose upon parties tendering for contracts—requiring a deposit of money to be made with the tender—was roundly condemned by Mr. Justice Jelf as being "most likely to lead to dishonesty "and the most insidious form of bribery." This remark was justified by the fact that in this case money so deposited actually remained in the hands of the Town Clerk, though the intention was that it should be repaid on the acceptance or rejection of the tender; and it requires but little knowledge of municipal affairs to lead one to understand that persons desirous of doing business would be reluctant to do anything to alienate from them the influence of so important an officer as the Town Clerk. Why such deposits should be required it is difficult to understand. The reason given at the trial—namely, that it is to prevent persons making frivolous tenders—is surely wholly insufficient. "Frivo-"lous" tendering is, we venture to say, a pastime but little indulged in; and were it otherwise, it is quite easy of detection. There can be no necessity for a safeguard against a practice which does not exist; but parties tendering should be required to give some assurance of their ability to fulfil the obligations they are desirous of incurring, and, in all important cases, security for the due performance of their contract. Provision is always made for this in properly-drawn specifications; and the acceptance of a tender is made conditional upon all the reasonable requirements in this respect being satisfied. In no case ought it to be deemed necessary to enforce payment of a deposit as a preliminary to tendering; and even where a small payment is required to cover the costs of copies of specifications or drawings, opportunity should be afforded to parties tendering to take particulars of such documents for themselves. In saying this, it is not in the least intended to suggest that there is anything that can be reasonably objected to in charging contractors for copies of drawings or specifications. What is meant is that contractors should not be able to say they were compelled to buy them.

The payment of commission by certain Parliamentary Agents to Clerks of Local Authorities for work entrusted to them by the latter clearly requires to be stamped out unsparingly. That any public official—to say nothing of those in highest authority—should have a direct and personal interest in piling up a bill of costs against the authority whose interests he is charged to defend, is simply monstrous; and such a state of things ought to be permitted no longer than is needed for the necessary inquiry to be made into the extent to which such practices still prevail. At the present moment, the innocent as well as the guilty rest under the ban of suspicion; and it must be to their interest to clear themselves as speedily as possible by insisting upon a public inquiry. Secret commissions are not, it is true, discoverable by public audits; but the latter, if efficiently carried out, should have discovered or prevented the grosser of the offences which these proceedings have brought to light. That a public official should be able to sell the property of a corporation and pocket the proceeds without anyone being the wiser, seems almost incredible; nor could it be possible except on the supposition of ignorance and supineness on the part of the Council. Unfortunately, there is in London

no healthy public opinion such as affords a wholesome restraint in the Provinces. Only a few are interested in the election of representatives; and this consequently but too often degenerates into a "hole and corner" affair, with the result that the whole conduct of business is in the hands of officials. It is greatly to be hoped that one effect of this scandal will be an awakening to the need of more active interest being taken by the citizens in local affairs. There is not a dweller in this great city who would not repudiate with scorn the accusation of not being patriotic. Patriotism is, indeed, the greatest and most necessary of all civic virtues; but, like charity, it begins at home.

The Institution and their Memorial to the Board of Trade.

The courteous tone in which Mr. Isaac Carr has couched the protest and suggestion which appears in our "Correspondence" columns does not, we think it may in fairness be claimed, hide the intention. It is, it will be obvious to all, the first step in an attempt to incite hostility to the proceedings of the Council and members of the Institution in the matter of the resolution passed at the close of the last annual meeting in regard to the fundamentally corrupt test for gas of an illuminating power other than 16 candles proposed by the Departmental Committee of the Board of Trade, and to the subsequent endorsement of the memorial to the Board at the meeting held at the Earl's Court Exhibition. That Mr. Carr should have taken upon himself the initiative in this respect, is precisely what one might have expected. It is impossible in this matter to detach Mr. Carr, the member of the Institution, from the Mr. Carr who is the only member of the gas-engineering profession whom the London County Council have retained, on most occasions (or perhaps we may say could succeed in retaining), to support their policy of repression in connection with the gas industry; and therefore, too, it is impossible to dissociate prejudice and interest from his letter. Whatever right Mr. Carr may have on his side in regard to a point of order, he cannot close his eyes to the unanimity with which the members assembled at the last annual meeting condemned the monstrous proposal as to testing which the Departmental Committee recommended should be applied to the gas industry, nor to the fact that in that large concourse of members there was not a single dissentient to the suggestion made by the then President (Mr. H. E. Jones) that the Council, in their behalf, should approach the Board of Trade, and lay before them their case against the suggested injustice. There are only two ways of approaching the Board of Trade in such a matter as the one under notice—by deputation or by memorial; and no one can compel the Board to receive a deputation. The memorial, we understand, had the unanimous approval of the Council—a Council larger and more representative of the Institution and the profession than any Council have previously been; and, furthermore, as already remarked, their decision was ratified by the members of the Institution at the Earl's Court meeting. The action of the Council, in view of the distinct nature of the protest at the last annual meeting, and the urgency of the matter, will no doubt be well defended at the proper time against any attack, whatever be its underlying motive or incentive. Where there is agreement on the main point of the viciousness of the recommendation of the Departmental Committee, where there is conviction as to an injustice to the gas industry, that agreement and that conviction will relegate to quite a secondary place any merely sentimental or interested objection on a point of order.

A Cause Célèbre.

The case of *Graham, Morton, and Co., v. L'Union des Gaz* was called yesterday morning (in Court No. 5 of the King's Bench Division of the High Court of Justice), before Mr. Justice Grantham; and a few minutes later Mr. Rufus Isaacs, K.C. (with whom are Mr. Simon and Mr. Paddon), was opening what is likely to be the most remarkable case that has been witnessed in the gas industry for some time past, and probably will be for some time to come. The case is attracting great attention; and to both sides very naturally it is causing much anxiety. There are vast interests at stake—reputations as well as considerable sums of money. It should be explained that the Union des Gaz is to an extent synonymous with the Continental Union Gas Company, as has been frequently explained in the reports of the proceedings at their annual meetings. The plaintiffs are claiming the sum of £4000 from the Company, the balance of retention, money in respect of two contracts (one representing £39,328, and the other £38,328) connected with the inclined retort installations at the Milan Gas-Works, as described in the "JOURNAL" for Jan. 13 and 20, 1903. The defendants put forward a counter-claim for damages to the no mean sum of £70,000. Of course, allegations of defective work are at the bottom of the whole business; and therefore the seriousness of the issue for both sides will be appreciated. Models, plans, letters (in numerous bundles) and piles of documents show the complication of the case, which is being tried by arrangement between the parties, and with the permission of his Lordship, without a jury. Mr. Rufus Isaacs' opening address occupied the whole of the sitting of the Court yesterday; and it was really a brilliant achievement. The grasp by the eminent and popular Counsel of the technicalities involved, was remarkable—his description of the combustion chamber, flues, and settings generally, the actions that take place in them, and the travel of the gases and air, bearing that lucidity which one would only expect to hear from a gas engineer gifted with fluency. The facts of the case will have to be gathered from the ordinary report; and, of course, all comment must be reserved for a future occasion. But it may be said that the case has many components—the construction of the settings, the difficulties with labour in Italy, the prejudice of the stokers, the question of the tests of the settings, the guarantees, the condition of the coal used in the retorts, the heating of the retorts, the reports made by the Engineers, and the eventual demolition of one of the four benches by the Company without giving the plaintiffs notice. According to Mr. Rufus Isaacs, the only ground for this, so far as the plaintiffs could ascertain, was the fluxing of the bricks and material in some of the passages of the settings. The plaintiffs are endeavouring to show, from the reports and correspondence of the Company's Engineers, that the defendants are entirely out of Court, and that the demolition of the benches, together with their reconstruction by a French firm were not warranted, and were, in fact, an absolute waste. When the Court rose yesterday, Mr. Isaacs was still on his opening, and was then dealing with a report made by Mr. Corbet Woodall. The plaintiffs have a large amount of evidence to call; among their witnesses being Mr. Charles Hunt, Mr. S. Y. Shoubridge, Mr. W. R. Herring, Professor Vivian B. Lewes, Mr. J. S. Naylor (Manchester), Mr. Hulse (Leeds), Mr. Ratcliffe (Leeds), Mr. Leech, Mr. Tranfield, Mr. Jeffreys, Mr. Davis, and Mr. Waller (Sydenham). Defendants are being represented by Mr. Hamilton, K.C., and Mr. Spokes. Mr. Arthur Lucas, the Chairman, and several of the officers of the Company were in Court. Mr. Corbet Woodall, Mr. G. C. Trewby, Mr. F. D. Marshall, Mr. Freyess (Inspector for the Company), and Mr. Alex. A. Johnston (Ilford), are among those who are likely to be called to give evidence on their behalf.

An Official Salaries Committee.

For the second time, the Stockport Town Council have decided to try an experiment in the shape of appointing a Special Committee to deal with applications or proposals for advances of the salaries or wages of the officers or servants of the Council (other than workmen receiving weekly or daily wages) recommended by any other Committee of the Council. It is not proposed that this Committee should fix the salaries, but merely review them, and secure as far as possible the same rate of remuneration in the different departments, as well as settle a maximum. The Committee is to consist of the Mayor and eight other members; but, as mentioned, the fixing of the salaries will still remain in the hands of the Council. Last year a somewhat similar Committee was appointed, but apparently without any very satisfactory result. The majority of the Council, however, evidently consider that the experiment is worth another trial; and if it succeeds in putting an end, so far as Stockport is concerned, to the waste of time that so often occurs at the meetings of Local Authorities when salary questions are under discussion, it will be abundantly justified. But it does not seem to be quite certain that it will do this; for some of the members of the Council may feel just as little inclined to accept without protest the recommendations of this small Special Committee as they might be proposals which came direct from the particular Committees under whom the officials concerned were

working. Another suggestion was made, that the question of advancing salaries and as far as possible equating those paid under the various Committees should be dealt with at a special meeting of the Council in committee during April in each year. Inasmuch as the proceedings would thus be private, all temptation would be removed to deliver "popular" speeches; and in this way one of the great drawbacks to the discussion of such matters in open Council would be removed. This is, of course, not the only point to take into consideration, and it is not one that the Council had in mind when discussing the matter; but it is the one that most readily occurs to us. The Chairman of the Gas Committee, for instance, favoured the "Council in committee" idea, because he thought each Committee should deal with the salaries of its own servants, and that it would not be fair that the Committee should waste time over such matters, and then have them passed over to another Committee. On the other hand, it was urged by one member in support of the appointment of the Salaries Committee that it was not right that "where the Chairman or Vice-Chairman or some member of a Committee might be on terms of personal friendship with one of the heads or the superintendents of the department, this official should receive so much more money than another person in another department who was not so favourably placed in his relationship to the Committee and his Chairman." But whatever may have been the precise reasons that actuated the Council, the Salaries Committee has been again appointed; and it only remains to be seen how far successful it will be.

The Purchase Clause and Non-Statutory Gas Undertakings.

In our "Correspondence" columns is a letter on the subject of the refusal of Mr. Agg-Gardner's Committee to impose upon the Hitchin and District Gas Company a purchase clause—the meritorious management of the concern having evidently appealed to the Committee as being a complete justification for departing from a precedent that has for its chief vindication age, but not in the majority of cases a vestige of equity. Confidently, it is asserted, its application would not be equitable in this particular case. The general question was discussed last week; and all that we desire to do here is to call attention to the point in our correspondent's letter as to one objectionable and harmful influence of past practice in respect of the insertion of the purchase clause in the Bills of non-statutory companies. He states that "even the best-managed companies have been afraid to go to Parliament, because it has been known that it was almost a certainty a purchase clause would be forced upon them." To this we may add that our correspondent does not speak without personal knowledge, as we are aware that some three or four companies have been advised by him to refrain from going to Parliament simply and solely on account of the probability that such a course would result in their being dispossessed of the business which their own venture and industry had built up. And he gave this advice conscious of the fact that "it is an advantage to the public that a company should be placed under statutory restraints, and to the company that it should have statutory powers." Although our correspondent does not append his name to the letter, it may be said that the position of his Company, and their complete modern statutory powers, are eloquent of the appreciation of their chief adviser of the value of a forward policy.

An Example of Public Lighting.

When the question of public lighting is under discussion, Liverpool always takes a prominent place, mainly owing to the fact that the Corporation have shown themselves sufficiently farsighted to employ for this purpose, almost entirely, the gas which is supplied by a Company rather than the current which could be obtained from their own electricity undertaking. This policy is so greatly at variance with that pursued by many other Local Authorities, who have embarked on extensive and expensive schemes of electric street lighting in order to provide badly needed business for their own trading concerns, that it merits all the attention it has received. The superiority of the incandescent gaslight would alone be amply sufficient to justify its preference; but there is, in addition, to be taken into consideration the very great difference in cost. What Liverpool has been able to accomplish by adopting really up-to-date methods of public lighting will be gathered from the summary of the annual report of Mr. C. R. Bellamy, Assoc.M.Inst.C.E., the City Lighting Engineer, which appears in another part of to-day's issue. As compared with eleven years ago, no less than 168 miles of street lighting have been added, necessitating an increase of 65 per cent. in the number of lamps; and though the aggregate illuminating power has been more than quadrupled, the cost has been increased by only 16 per cent. If, however, the added districts are removed from the calculation, it is possible to see even more clearly what has been the effect of the substitution of incandescent lighting for the old flat-flame burners. Within the area that was covered in 1893, a mile of street lighting has been added, and 1989 extra lamps have been fixed; while the total illuminating power has been more than trebled. In spite, however, of this larger number of lamps and vastly increased lighting power, the cost has been reduced by no less than 13 per cent. Under the latest conditions, Liverpool enjoys an aggregate illuminating power from the 18,360 public lamps of 3273 million candles, at a total charge of £47,648; the net expenditure in connection with the public lighting of the city and the supervision of the gas supply being covered by a rate of 3½d. in the pound, as compared with 4d. ten years ago. Another matter of interest referred to by Mr. Bellamy is the tests made by means of the portable photometer, the average result of which, it will be seen, was within 0·04 candle of that secured at the Corporation testing office.

Proposed Ministry of Commerce and Industry.

The Bill introduced by Mr. Louis Sinclair, the Conservative member for Romford, to establish a bureau for a Minister of Commerce and Industry, has been printed. The proposed Ministry is to consist of a permanent Council of experts, representing various trades and industries, and to be elected for a definite period of five years. A large portion of the powers, duties, and liabilities of the Board of Trade, the Local Government Board, the Home Office, and the Board of Agriculture—as set out in the schedule to the Bill—are to be transferred to, and vested in, the Ministry, who are to have authority to establish a department of manufactures to foster and develop manufacturing interests, another to investigate the management of corporations, joint-stock companies, &c., and others dealing with treaties, tariffs, commercial missions, and foreign agents. One would suppose that these duties would be sufficiently comprehensive; but the Bill gives the King power, by Order in Council, to transfer to the new Ministry the duties of any Government Department which appear to be suitable to be discharged by them. Holding the office of Minister of Commerce is not to render the occupant incapable of being elected to a seat in the House of Commons, and voting on questions before it. On the formation of the Ministry, the necessary officers from other departments are to be transferred to it. Among the powers of the Board of Trade which it is proposed to entrust to the new body are those conferred by the Patents Acts, the Railway and Canal Traffic Acts, the Harbours and Docks Acts, and the Weights and Measures Acts; the Local Government Board are to lose their jurisdiction under the Alkali Works Acts; and the Home Office theirs under the Factory and Workshop Act, 1901.

Gas Managers as Municipal Councillors.

Just before the municipal elections last year, we dwelt on the advantages likely to accrue from the election of officials of gas companies as members of the local governing bodies. We are therefore pleased to record the successful candidature of Mr. George Stevenson, the Manager and Secretary of the Long Eaton Gas Company, for a seat on the Urban District Council for the town. He offered himself as an Independent, against four Liberals and another Independent; and at the election on the 1st inst. he went in at the top of the poll with 1235 votes—the largest number ever given to a single candidate. When it is mentioned that Mr. Stevenson is the youngest member on the Council, and that his candidature was not thought of till a fortnight prior to the election, the result may, we think, be regarded as a striking testimony to the confidence of the ratepayers that he will act in the best interests of the town, of which he is a native. Another instance of the choice of a Gas Manager as a representative of the ratepayers occurred on Monday last week at Cleethorpes, where Mr. E. J. Brockway, the Engineer and Secretary of the Gas Company, was returned at the top of the poll in the Middle Ward. He received 308 votes, and the second representative 256.

WATER AFFAIRS.

The First Year's Work of the Water Board.

In accordance with the provisions of the Metropolis Water Act, 1902, the Metropolitan Water Board have presented to the Local Government Board, and also to Parliament, their first annual report, which has been printed, and a summary of its contents will be found in another part of the "Journal." As the Board did not come into possession of the Companies' undertakings till the 24th of June last year, the report for the twelve months ending the 31st of March, 1904—the Board's first year—would not have been very interesting had it not been for certain later information furnished by foot-notes and appendices, which have been judiciously added to make the story as complete as possible. There is little to call for notice in the report itself. It records the establishment of the Board and the arrangements made for the conduct of its business and the raising of the necessary funds, the work of the Court of Arbitration constituted by the Act, and their decisions on the various points of law raised. Particulars are given in regard to the settlement of the claims of the Tottenham and Enfield District Councils for the works taken by the Board from them, and of the Board in respect of those transferred to the Corporation of Croydon. In the case of Richmond, an agreement was come to with the Corporation by which the Board were to be paid for the works transferred under the Act, and were to furnish a supply of water in bulk. The most interesting features are the appendices to the report, which contain statistical and other particulars of the Companies, their districts of supply and the population, the capital expended by them, and the amounts awarded by the Arbitrators. The Board have done well to include the important statement of the Court upon the subject of the quality of the water supplied by the Companies, as well as their judgment on the questions of the sinking fund and sterilization clauses, because these can be conveniently referred to at any future time without resorting to the minutes of evidence. It is not necessary to allude to the legal matters, but attention may be again called to the fact, already noticed in the "Journal," that the Arbitrators accepted the conclusions arrived at by Lord Balfour's Commission in 1892-3, which were confirmed by that of Lord Llandaff in 1899, as to the "high standard of excel-"lence and of purity" of London water, and as to its suitability in quality "for all domestic purposes." The Arbitrators felt that, in face of the evidence submitted to them, they were bound to hold that the waters of the Thames and Lea must be considered as capable of being "supplied in "excellent condition." These are the principal sources at present at the command of the Water Board; and the public may rest assured that there will be no relaxation by this body of the efforts made by their predecessors to ensure the maintenance of the excellence which called forth the foregoing testimony.

The Rivington Arbitration Trouble.

As will be seen by the report which appears in our "Legal "Intelligence," the Liverpool Corporation have signally failed in their attempt to set aside the award of Mr. R. E. Middleton as Umpire in the arbitration between them and Mr. W. H. Lever, of Port Sunlight, to determine the amount of compensation to be paid to him for the portion of his Rivington Estate required for the purposes of their water undertaking. Such a proceeding is exceedingly rare, inasmuch as the mere fact of submitting opposing claims to arbitration justifies the conclusion that the respective parties are willing to abide by the result. The sellers usually put the highest, and the buyers the lowest, value upon the property in question; and the third party, as a general rule, "splits the difference." Possibly neither side is quite satisfied with the decision; but, unless there has been some very serious mistake on the part of one of the gentlemen concerned, the award has to be accepted as final. Was there anything of the kind in this Liverpool case? The Corporation thought there was; and, it must be acknowledged, there appeared to be good ground for the supposition. That an estate for which £60,000 had been originally paid should have so increased in value in a year or two as to justify a demand for £457,000 for a portion of it, seemed altogether improbable; and therefore, acting upon the best advice, the Corporation, through their Water Committee, offered Mr. Lever £40,000. If this sum had been accepted, the 400 acres of the estate which he had given to Bolton for a park and the portion on which his bungalow stands would have cost him £20,000. But it was not accepted; and consequently the price had to be settled by arbitration. In the result, £138,449 was awarded—£98,449 more than the offer, and £318,551 less than the demand.

Astounding as the Umpire's decision was, it would have been wise on the part of the Corporation to have accepted it. But they decided—not, however, without some dissent—to allow Mr. Lever to proceed against them for specific performance of their agreement; and they did so mainly on a purely personal matter affecting the Umpire. Not only did they contend that he had exceeded his jurisdiction in entertaining certain questions as to water rights, but that his mental condition at the time he made his award was such as to incapacitate him for the proper discharge of his duties. Allowing that the difference between the award and the offer was sufficiently great to justify investigation as to the factors which had operated to produce it, the Corporation were scarcely warranted, unless possessed of the strongest evidence, in attributing it to incompetency—temporary, it was admitted—in a professional man whose status and special experience were such as to lead to his selection by the Board of Trade. Yet this evidence was not forthcoming at the trial; and what was adduced by the Corporation was acknowledged by their own Counsel to be useless. Justice Warrington, who tried the case, expressed surprise, after hearing it, that a body like the Corporation should have put such a plea on the record. He held the award to be valid, and gave judgment for the plaintiff, with costs.

It is not difficult to see that the Corporation have brought this trouble upon themselves by their initial mistake in not securing the Rivington property when it was in the market a few years ago. Mr. Lever had his eye upon it then; but he offered to retire in favour of the Corporation. They preferred to retire in his; and they must not complain if he has made the best of his bargain. He comes out of this business the possessor of a nice little estate, and figures as the donor of a park, bearing his name, to his native town of Bolton, the inhabitants of which will look upon him as a public benefactor, and possibly erect a statue to his memory in the time to come. As the Corporation will have to pay more than three times as much as they expected for the lands they require, as well as the costs of the arbitration and of Mr. Lever's action, the ratepayers of Liverpool may possibly regard him in a different light. This, however, is a matter upon which it is needless to speculate. The lesson to be learnt from these proceedings is that it is dangerous to attempt to set aside an award, unless there are very good grounds for so doing.

Gas Consumers and Employees as Stockholders.

We understand that the Commercial Gas Company recently made a further offer of stock to their consumers and employees, which met with a ready response, and stock to the value of upwards of £30,000 was allotted to them. It is gratifying to find how thoroughly consumers and employees appreciate the facilities afforded them for acquiring a share in the fortunes of the gas undertaking with which they have business relations.

Parisian Stoking Machinery at Beckton.

Several notices descriptive of the electrical turbine charging-machine and discharging-ram which were installed at the Beckton Gas-Works having been made in the "Journal," the history of their trial may now be completed by stating that they have been definitely removed from the retort-house in which they were being used. We are informed that the sole reason for this is that the machines, having been made at the Paris Gas-Works—where the conditions of working are altogether dissimilar to those at Beckton—it was soon found that the general construction had about it a refinement and flimsiness that were not suitable for the circumstances of such large retort-houses as those at Beckton. To this was due the failures of parts of the machinery. Those responsible for the design, however, are to-day as convinced as ever that the principle of the machinery is correct in all points; but that the structural work must be of a strength suitable to the variation of circumstances under which the machines are to operate.

The Liverpool City Council, at their last meeting, granted an increase in salary from £1200 to £1400 per annum to Mr. C. R. Bellamy, Assoc.M.Inst.C.E., the City Lighting Engineer and General Tramways Manager.

DEVONPORT GAS ENGINEER'S RESIGNATION.

However regrettable it may be, the announcement that Mr. Sidney E. Stevenson has resigned the position of Engineer and Manager of the Devonport Gas-Works will cause no surprise. Such friction as has been shown to exist between the Engineer and the Gas Committee was bound to have some such result. As was said during one of the recent debates on the water-gas question, the time had come when either the Chairman of the Committee or the Engineer must go; and as the Chairman was able to command a majority in the Town Council, there was practically no alternative before Mr. Stevenson but to offer to sever his connection with the undertaking. It remains to be seen whether the Council, at their meeting on Thursday, will further endorse the action of the Committee in really forcing such a position upon the Manager. In the meantime, there is to be a town's meeting of ratepayers, at which the whole question of the management of the undertaking will no doubt be submitted to a popular vote. Whether the result will in any way affect the action of the Council, remains to be seen. Little is, however, to be expected from any such manifestation of uninformed and possibly prejudiced opinion. Unfortunately for the success of the undertaking, and still more unfortunately for Mr. Stevenson, the dispute—if it deserves to be so called—is being made one of party politics. The vote at last week's meeting of the Council upon the question of whether carburetted or "blue" water gas should be installed at the works, proceeded, we are told, upon party lines. It was made a question of confidence by the Chairman of the Gas Committee, and his followers in the Council rallied to his support; while the minority, if they did not actually back up the recommendation of the Engineers, voted at least for postponing the decision with a view to further inquiry.

It is a remarkable illustration of the methods of municipal government that such peculiarly technical matters as the difference between one and another system of gas making should be regarded as a fitting subject for political disagreement. The experience is not by any means unique. Partizans have before now made rallying cries out of ideas quite as incongruous, and have broken each other's heads to the sound of slogans no more inspiring than the "blue" and "carburetted" of these Devonport Councilmen. But it is not by such means that the best results in gas management are to be obtained, nor the services of the best men to be secured for carrying on municipal undertakings. Some there are who, in the exercise of worldly wisdom, follow where they should lead. A Gas Engineer who finds his Chairman and Committee strongly inclined to a certain line of action, needs some backbone to set his experience and judgment against their wishes or prejudices, particularly if the point of sufferance is open to any fairly arguable doubt. He may feel convinced that the Committee are wrong, and that if his own ideas could be translated into deeds the result would be more advantageous to the undertaking and to the ratepayers and gas consumers whose servant he is; but he will probably be held not greatly to blame if he takes the view that the decision in any case is not his, and that the people who put his masters into office must abide by the consequences. Not by such means is gas making, or any kind of business, carried on most successfully; and it is not upon such lines that the most flourishing undertakings, whether under corporation or company management, have reached their pre-eminence. What one looks for in all such concerns is the subordination of personal likes or dislikes to the one end of the ultimate good of the business. No one can find fault with Directors or Committees for the fullest investigation of any scheme involving large expenditure of capital or affecting general policy of administration. It is, however, quite another question when they set up their own notions of what is right or wrong in purely technical matters, and endeavour, as the Devonport Committee have done, to wring unwilling endorsement of them from their Engineer.

From some of the things said during the two long debates in the Town Council reported in the "Journal" of March 28 and to-day, it would appear that there have been other causes of difference between the Gas Committee and their Engineer than this question of water gas. Pointed reference was frequently made to the manner in which the extension of the gas-works has been proceeded with. Speaker after speaker alluded to the very large capital outlay which has been incurred without adding in the least to the means of production. "Thousands of pounds have been spent," they said, "and yet we cannot make a cubic foot more gas than before." This is a point upon which the Council ought to have sought for information from their Engineer. On many grounds, it is very deplorable that the majority of the members deliberately deprived themselves of the assistance which the whole body might have derived from the presence during the discussion of the Consulting Engineers; and it is a pity that the minority did not, upon such a question as this, insist upon demanding an explanation from Mr. Sidney E. Stevenson, who was present.

The scheme for the alteration and enlargement of the works as originally proposed was of a very comprehensive character. Commencing with coal-stores, it included retort-house with inclined retorts, water-gas plant, condenser, boiler, engines and exhausters, scrubbers and washers, purifiers, holder, governor, and carburettor, with mess-room and other accommodation for the men. It was a sufficiently wide scheme, and when carried out will completely alter and modernize the works. So far, however, the only portion of it actually completed is the erection of a new purifier-house with purifiers; while there is a holder in course of construction. A great deal of capital has been also laid out on mains, of which there has been a large extension in the district added to the borough a few years ago. The responsibility for the manner in which the works have been carried out clearly does not lie entirely with the Engineer. Messrs. Stevenson and Burstal urged the need of an immediate provision of purifiers and condenser; but beyond this the scheme proceeds in its natural order, beginning with the manufacturing plant and ending with storage. Why was the order changed? Obviously one reason for the delay in reconstructing the retort-house arises from the controversy over the water-gas plant. If this had been determined a year or eighteen months ago, when the question was declared to be urgent, the plant might have been installed long before this and the reconstruction of the retort-house have been already in hand. Another reason for the change of plan is said to be based on some supposed diplomatic consideration. The Council, it seems to have been thought, would more readily agree to the expenditure on a gasholder than on retorts, though why they should have done so, except out of mere perversity, we do not know. At all events, the holder was put in hand and the retorts were not, with the result that the Corporation have still a considerable expenditure to face before they obtain the remodelled and modernized works which they set out to construct.

On the financial side of the undertaking there seems to be need for some enlightenment. Messrs. Stevenson and Burstal estimated the total capital expenditure on the undertaking at the time of the completion of their scheme at £250,000, which for works capable of producing 400 million cubic feet of gas per year cannot be considered as excessive. This scheme received the approval of the Gas Committee and of the Council; and it seems a little late in the day to begin to criticize it two or three years after it was commenced. It is, however, a legitimate subject of inquiry to ask how far the results compare with the estimate, and what prospect there is of realizing the expectations formed by the consultants as to the financial results of their proposals. If the Gas Committee have any information on these points, they carefully concealed it from the Council, while (not too wisely, as we think) they rejected the suggestion of an independent inquiry into the position and prospects of the undertaking. Such an inquiry might conceivably show that the Gas Committee have still a little to learn about gas making, in spite of their two or three years' experience of the business.

A PEEP INTO THE "QUESTION-BOX."

It is not proposed to attempt a complete review of the matter composing the volume of the "Question-Box" of the Ohio Gaslight Association for 1905. To faithfully perform the task would mean a steadfast application to the work, and to it alone, for perhaps weeks; and the result would not, in a journal with many claims upon it, justify the expenditure of the time and space. In last week's issue, our appreciation was expressed of the assiduous performance by the Editor (Mr. Henry L. Doherty) and his staff of the laborious work entailed by this volume; and the expenditure of money in the production was pointed to as being—not an example to be emulated in precisely like manner, but as an example of a liberal and enthusiastic devotion of money in the cause of the technical work of the industry that we should like to see more of in this country. Since last year the volume has almost trebled in bulk; and this fact, combined with such investigation into the contents of the book as the few days have permitted since its receipt on Monday last week, inclines one to seriously ask two questions: Where is this going to stop, and does the result as we have it in the bulk before us vindicate the outlay? Of the utility of the Question-Box system worked with discretion, we entertain not the slightest doubt. Its usefulness is all that has ever been claimed for it by its devotees; and we distinguish entirely between that aspect of the question and the one to which, in these opening paragraphs, consideration is to be given. The ardent Editor of the volume tells readers in his introduction that the expenses of the work this year will amount to nearly four times the revenue of the Ohio Gaslight Association for 1904, or to, approximately, 50 per cent. of the aggregate revenues of the Gas Associations in America. Besides this, it will cost $600 for mailing the edition to those who are entitled to copies. We believe that four times the revenue of the Ohio Association for 1904, or 50 per cent. of the total revenues of the Gas Associations of America, would be somewhere in the vicinity of $6000, which represents, roughly speaking, £1250. No one can say where the work of the Question-Box is likely to stop with such energy as is now being exercised in propelling it forward, and, therefore, how much greater is the annual volume likely to become? But this is certain, that, on Mr. Doherty's own showing, if only the same expenditure continues to be incurred over the production of the volume as in the past year—unless revenue resources are quickly and substantially supplemented, or unless there is special income for this purpose of which we are not cognizant—the Ohio Association will be landed in a state of insolvency.

This being the only view that one can possibly take in the circumstances (assuming that the volume is not specially subsidized),

the next question is, How can the excellent work be continued to the general advantage and at an expense that will be more in consonance with the revenues? Deliberation gives issue to only one conclusion, and it is that the printing of the whole of the questions and answers in the gross is extravagant and unnecessary. Last year, in reviewing the volume in the "JOURNAL," it was remarked: "It would be an invidious thing to ask the Editor to individually accept the duty of separating the wheat from the chaff; but, if something of the sort could be done, it would, in our opinion, bring the Question-Box volume down to admirable limits, and enhance considerably its value." On looking into the present volume, the opinion of twelve months ago is not only that of to-day, but that of to-day is much stronger than that of a year since. The year, however, has seen the step taken that is to put this great accumulation of inquiry and response into more available form, and to extract all that is good from it, and so produce a handbook or encyclopædia which cannot be otherwise than of considerable value to the universal gas fraternity. That step is the appointment of the Revision Committee, over which Dr. Harrop presides. Their work, it seems to us, is what we have to look forward to as the *terminus ad quem;* and the collection and assortment of the questions and answers can only be looked upon as the *terminus a quo*. The collection and assorting, Mr. Doherty has conclusively shown, impose quite enough liability upon his department; and the revision is quite sufficient for Dr. Harrop and his colleagues, with even any outside help they can command or secure. In this 1905 volume, there are 567 questions, 4920 answers, the indexes, lists of contributors, the introductory matter, and so on all lumped together, and forming a volume of 916 pages. Now why have all this printed, when eventually, after revision, sorting out, and condensation, we shall have the whole thing, it is anticipated and hoped, in more handy and convenient form? The printing is the costly part of the Question-Box volume; and to print the whole of the questions and answers, when in them there is a good deal of overlapping and reiteration, does seem to us to be a very wasteful process, in view of the further printing that will be needed when the Revision Committee have accomplished their task, which is, by no means, an enviable one.

Let us take the very first two questions in the volume in support of the allegation that the printing of this volume until a digest is made is a prodigal method of conducting the Question-Box. The first inquiry is: "Is it customary to take the specific gravity of coal as a means of checking the uniformity of the supply?" There are eleven replies to this question, occupying, with the inquiry itself, the best part of a page of the volume; while the whole result of the answers could be put in perhaps three or four lines —"the whole of the correspondents (naming them), except one, reply in the negative, and point out that such a test would have no practical value. The single dissentient speaks of it as a practical means." The second question is, "Will freshly-mined or weathered coal yield the most ammonia?" There are nine gentlemen who contribute replies, which are set out; and the whole is summed up in the words "freshly mined." But three-quarters of a page is absorbed in setting out the answers. This is where the extravagance of this system of conducting the Question-Box comes in; and we cannot help thinking that the money spent on the printing of the volume would be better employed on the ultimate work of revision and concentration, and then publication, without interfering in any way with the preliminary work of collection. Flour takes up less storage room than wheat as reaped; and relatively the cost of storage is less. The application of this to the subject under consideration will be readily discerned. Of course, on the other hand, it may well be contended that delay in publication would depreciate the value of the work; but we should doubt it. In all probability, Mr. Doherty will have a complete defence of the present system as against the modified one we have in view; if so, it would be of great interest if he would present it.

However, turning to the questions, they are classified into eighteen sections—viz., (1) Gas-Making Material; (2) Manufacturing Equipment; (3) Manufacturing Operation; (4) Residuals; (5) Manufacturing Chemistry and Physics; (6) Storage; (7) Distribution Supplies and Materials; (8) Distribution Operation; (9) Chemistry and Physics (other than manufacturing); (10) Gas-Engines; (11) Gas-Burning Appliances; (12) New Business Methods; (13) Collections and Dealings with Consumers; (14) Accounting (other than collections); (15) Management; (16) Legal Matters; (17) Literature; (18) Miscellaneous. The whole of these sections cannot come under review; but in passing through them, it is noticed that the names of the British contributors are sprinkled fairly well through the pages of the volume.

Taking the first section—"Gas-Making Material"—it is remarked that a large number of the questions allude to water-gas matters; but whether referring to water gas or other topics, the indication is that the knowledge is required with the view of attaining to greater efficiency and economy. To the replies to only one or two of the inquiries can attention be directed. The question is asked, among several others, as to whether any experiments have been made by lighting companies in the utilization of fine coal, breeze, poor or unsaleable tar and coke, &c., to make cheap producer gas for gas-engine power. The general opinion is that the proper place for such material is under the boilers; but one contributor states that, in his laboratory experiments, utilizing (say) 100 lbs. of mixed coke, waste coal, tar, &c., with a suitable supply of hot blast and steam in a Taylor model producer, satisfactory results can be obtained. This writer mentions that last winter his experiments resulted in the conversion of about 95 per cent. of the carbon present into forms suitable for use, and that not more than 2 per cent. of carbon dioxide was present as a contaminating substance. It comes somewhat as a surprise to find that we have to go to this volume to learn, for the first time, from a second contributor, that what is suggested by the question is being done all over Europe by the gas companies, who, after thinking they had lost the field to electricity, finally found out that electricity generated with gas-engines fed with producer gas was cheaper than when produced any other way, even by water power. "To-day the gas companies own most of the electric light concerns in average-sized towns; and gas has won the day, as it will ultimately do on this Continent also." There is a little mistake here, both in regard to the first part of the reply and as to the ownership of electricity undertakings. However, one other contributor states that slack coal and coke breeze can both be used in the manufacture of producer gas for power purposes; and a considerable economy is thereby effected. With careful operation, 1 brake horse power per hour may be developed in a good gas-engine with a consumption of 1 lb. of slack coal, 60 per cent. of which will run through a ¼-inch mesh. This particular slack had been badly weathered, and contained only 13 per cent. of ash, and only 17 per cent. of volatile matter. There is an interesting question as to the use of coal tar for carburetting in whole or part in water-gas apparatus. The experiments quoted in the replies are sufficiently discouraging to the putting into practice of the suggestion.

In the section of "Manufacturing Equipment," tar pumping and burning, and matters affecting fire-clay productions are good contributions; but really one would have imagined that, among gas men, the answer would have been common knowledge to the question, Are there any instruments in use for ascertaining daily the calorific value of gas similar to the way in which candle power is checked regularly? Among the replies to the question, Have any new labour-saving machines been brought out during the past year? there is one which directs attention to a new type of combined charging and drawing machine, which was brought out by the Riter-Conley Manufacturing Company, and has recently been installed at the Lowell Gas Company's works. There are two styles of the machine—one run by compressed air, and the other by electricity. These weigh about 18 tons *plus* a capacity of 6 tons of coal; and they are used for charging and drawing through retorts (twenty benches of eights)—one machine being in reserve. The electric machine carries a 5-horse power motor for transmission along the track, a 5-horse power motor to run the pusher and the scoop in and out of the retort, and a 1-horse power motor to dump the scoop in the retort. The carriage carries a double scoop, the two parts dumping toward each other. Fastened to the end of the scoops is the Ω-shaped pusher, which, as the carriage travels out of retort, rises above the coal. One travel of the carriage charges and discharges the retort. When no firing is being done, it is stated that the machine can discharge and charge ten retorts in less than ten minutes. Both machines move up and down by throwing-gears attached to the track motor. One man controls the machine on a twelve-hour shift. The frame of the compressed-air machine is similar to that of the electric. A compressed-air motor gives power for moving along the track and for raising and lowering. The pusher and the scoop work separately; the pusher being attached to a piston operated by compressed air and brought back by means of a weight. The scoop is pulled in and out of the retort by means of a chain attached to a drum; this drum being operated by a gear and rack. The rack is forced backwards and forwards by a piston run in a cylinder with an oil cushion. The preference seems to be for the electric machine; it being less liable to get out of order. The Riter-Conley Company, it may be noted, are the agents for West's Gas Improvement Company in America. From the answers to questions referring to inclined retort installations, there does not appear to have been any great headway made of late in America with this system of carbonization. The eyes of American gas engineers are at present directed to the great installation which is being constructed in connection with the gigantic gas-works scheme for New York.

(*To be continued.*)

The False Statements (Companies) Bill—which was recently brought in by the Attorney-General, and is supported by the Lord Advocate, the Attorney-General for Ireland, and the Solicitor-General—has now been issued. It provides "that if any person, being a director, manager, secretary, or other officer of any company, or being the auditor of a company, whether an officer or not, wilfully circulates, publishes, or makes or prepares for circulation or publication, or concurs in so circulating, publishing, making, or preparing, any written statement or account relating to the financial affairs or property of the company which he knows to be false in any material particular, he shall be guilty of a misdemeanour, and shall be liable, on conviction on indictment, to imprisonment for a term not exceeding two years, or, in the discretion of the Court, to a fine not exceeding £500." The measure is intended to include "every company formed for purposes of gain, and incorporated by Charter or by or under any Act of Parliament."

NOTES FROM WESTMINSTER.

At the beginning of last week interest was diverted from the Committee rooms to the House of Commons; and excitement ran high among promoters, parliamentary agents, and others over the obstruction to the progress of some twenty-one Private Bills for no other reason than to force the Government to grant

Obstruction.

to the Irish members a return recently ordered by the House with regard to the names, terms of service, and places of education of Government officials in Ireland—a motion for the discharge of the order having been placed on the notice paper on behalf of the Treasury. The South Suburban Gas, Accrington District Gas and Water, Wrexham Gas, Epping Gas, and Seaham Gas were of the Bills involved, and among the remainder were water and electricity measures. The tactics of the Irish members were successfully persisted in on Monday, Tuesday, and Wednesday; and not until well into the sitting on the last-named day was a compromise effected, by an undertaking that the motion for the discharge of the order should not be proceeded with. Prior to this a joint protest had been made by the Parliamentary Agents interested against the action of the Irish members in obstructing private measures which were altogether innocent of any association with the grievance. It was an uncommon but, under the circumstances, a warranted course for the Parliamentary Agents to take. The signatories to the document were Messrs. Dyson and Co., Messrs. Martin and Leslie, Messrs. W. & W. M. Bell, Messrs. Lees and Butterworth, Messrs. Durnford and Co., Messrs. Batten, Proffitt, and Scott, and Messrs. Lewin, Gregory, and Anderson. The document pointed out that there was no real ground for opposition to the Bills; it being prompted entirely by considerations wholly unconnected with Private Bill business. The Bills had all been considered by Committees of the House; and therefore it was respectfully submitted that they should be permitted to proceed. It was clear that the obstruction evoked much concern among the parties concerned; and the delay has not lightened expenses on the promoters through the attendance fees. One evening, it is reported, there were no less than fifty Agents in attendance watching the Bills in which they were interested. However, a compromise having been effected, the Bills are now pursuing their rightful course. The incident is worth mentioning as an instance of one of the many hazards besetting private measures.

Competition and Protection.

With so many precedents for regulation being applied, through the Bermondsey or Northumberland clauses, to municipal authorities who are seeking to enter into the business of electricity supply, or the sale of electrical appliances, and the fitting up of houses, it is somewhat singular—seeing that the whole intent is merely to ensure that the business shall be conducted on proper commercial lines—that there should now be any resistance to such a condition. The Ealing Corporation have accepted the Northumberland clause without entering into an argument over the matter in the Committee rooms with the Brentford Gas Company. That is a sensible arrangement; but the Rathmines and Rathgar Commissioners prefer to spend money right from the Court of Referees, and apparently onwards, in order to evade the obligation which the clause would impose upon them of conducting their business in electricity supply in a sound manner. This can be the only reason for resistance. The Alliance and Dublin Consumers' Gas Company, through Mr. Paddon, consequently applied to the Court of Referees for *locus* against the District Council Bill on the ground of fresh competition in an area which it is proposed to add to the Council's existing district, and in which area the Gas Company are large ratepayers. Further the Council have, under an arrangement with a private Company, been exceeding their powers with respect to the supply of electrical fittings. They now seek to put themselves into a legal position in this regard, and to obtain further powers in the same line. It will be an encouragement to others to know that *locus* was allowed the Gas Company in respect of the matters referred to here. In regard to the street operations of local authorities, the Bristol Gas Company have agreed with the Bristol Corporation on the insertion in their Bill of a very comprehensive set of clauses protecting their distribution system, and providing for compensation and expenses incurred through interference with mains and pipes. An indication of the nature of the clauses is given in our "Parliamentary Intelligence."

Electricity and Gas Lands.

Reference is made in our "Electric Lighting Memoranda" to the progress of the inquiry into the London Electricity Bills. It will be seen from what is stated there that the Gaslight and Coke Company and the South Metropolitan Company have been heard on the unreasonable (impudent, was the first adjective that came to mind) proposals of the promoters of the Administrative County of London Bill to compulsorily acquire certain lands which the Gas Companies hold for the purposes of their own business. In view of the explanation elsewhere as to the present position, it is unnecessary to give further information here.

A Gas Company's Electricity Bill.

Readers who have followed the announcements made as to the proposed gas legislation for the year will have taken note of the fact that the Shepton Mallet Gas Company are promoting a Bill to empower them to supply electricity within their limits of gas supply. This attaches unusual interest to the Bill; and its progress will, therefore (as will future events, if the measure reaches the dignity of an Act), be watched with some curiosity. The Urban District Council at first opposed the Bill for the purpose of obtaining certain modifications in it; but they have been convinced that their requirements were not such as would conduce to electricity supply by the Gas Company being made a success. From information obtained from the Manager and Secretary (Mr. J. B. Stone), it is learned that the Council desired to make the electricity concern a separate one—that is to say, with an entirely distinct Board, staff, capital, and works. But it was eventually proved to them that this would nullify the very object of placing the two concerns under one headship, staff, and so on; and that this was where economy could be effected to assist in making the enterprise a paying one. The Council gave in. Then the second point of their objection—and this the Gas Company regarded as a most vital one for them—was against "pooling," which the Council held could not be done. The result of conference was that the clause was left to the determination of Counsel. Then, if found unworkable, it is to be altered to make it workable. If power in this regard had not been allowed, the Company, in all probability, would have withdrawn the Bill.

Torpoint Water.

There has been a battle royal before Lord Stanmore's Committee in the Upper House over the water scheme promoted by the District Council of Torpoint. The whole contest was between the Council and Mr. Francis Rashleigh Rodd, of Trebartha Hall, near to whose estate the property proposed to be taken for the purposes of the works is situated. It was entirely a case of interference with the amenities of the estate, which no amount of compensation, it seemed from the evidence, could possibly satisfy. The case lasted several days; and it came as a surprise to many in the Committee room, as well as to the people of Torpoint themselves, to hear at the close of the completely argued facts that it was not expedient the Bill should proceed. A peculiar feature, in view of the decision, was that the Admiralty and War Office, under agreements for supplies from the new works, were represented by witnesses in support of the promoters' scheme. But even their aid did not produce success. The scheme contemplated appropriating the waters of the Withey Brook; but it was not intended to take more than ½-million gallons of water a day. The estimate for the land and other proposals set out in the Bill was £56,000; so it really was not a scheme of great magnitude. Torpoint, however, is a comparatively small place; and the opposition looked dubiously at the effect of the scheme on the rates and the development of the town. But there was one thing that was incontrovertible, and that is that Torpoint stands in serious need of a new supply of water. The opposition recognized this, and made the alternative suggestions that water should be obtained from Plymouth or from an intake on the River Lynher, near Trevagne—the increased cost of the pipes for this, as estimated by Mr. Charles Hawksley, being only £3652. But, of course, it was quite beyond the province of the Committee to consider the merits of alternative schemes, though they could be advanced as an argument that the one delineated in the Bill was not the only nor the proper plan of meeting requirements. Mr. James Diggle was the Engineer for the scheme, in support of which the number of witnesses called exceeded what might have been expected over a Bill of very much larger magnitude and with more opposing interests. However, Mr. Rodd's ancestral home and his "beautiful cascades" have been saved the dreaded injury; and Torpoint has now to look elsewhere for the satisfaction of its public needs. The Admiralty, under their agreement, have to pay one-half of the costs of the promotion of the Bill (which will amount to about £5000), and the War Department £1500; so that the ratepayers of Torpoint have not such a large amount of the expense to find as they would have had if the Council had been without such distinguished support.

Truro Water.

Earl Onslow has taken up his new position as Lord Chairman of Committees; and very diligently he is applying himself to his duties. In a group of Bills which came before him last Tuesday, was that of the Truro Water Company. The present share capital of the Company is £16,000, with, in addition, £4000 of borrowed money. A feature of the proposals of the Bill is that a sum of £3257 which has, since 1894, been expended out of revenue for capital purposes, should be repaid out of any premiums obtained by the issue of capital to be created under the Bill. In addition to fresh capital, the construction of new works and the purchase of further lands are provided for in the Bill. Among those who explained the objects of the Bill before the Lord Chairman were Mr. Ernest Mansergh and Mr. Samuel Wood, F.C.A. The Bill was ordered to be reported to the House.

Bolton Water.

A fairly substantial but necessary water scheme has been included in their Bill by the Bolton Corporation. That it is necessary in the eyes of the Chairman of the Commons Committee who are considering the matter is indicated by his suggestion at an early stage of the discussion of this section of the measure that the Corporation should endeavour to make peace with their adversaries; and to a large extent this has been done. The proposal of the Bill is to construct five new reservoirs on the present gathering-grounds, at a cost, including the auxiliary works, of some £752,000. The great existing Belmont reservoir is now used for compensation

purposes; and it is intended ultimately to utilize this reservoir for the town supply, and provide compensation water from two or three of the new reservoirs. The other two new reservoirs will be utilized to supplement the existing Entwistle and Wayoh reservoirs. The main part of the opposition was on the question of compensation; and some of the petitioners have been satisfied. Outside authorities are also asking for water for trade purposes at the same rate as is charged in Bolton. The manufacturers in the outer districts now pay a little more, which appears to be perfectly reasonable, seeing that Bolton has had to find the money for the water-works, and any loss would necessitate a rate-in-aid inside the borough and not outside. The Engineer (Mr. R. H. Swindlehurst, M.Inst.C.E.) was the chief witness for the Bill. The Darwen Corporation are also opposing. They hoped to maintain a contention that Bolton has no right to a monopoly of the water in that portion of the gathering-ground included in an outlying part of the borough of Darwen. It is denied by the promoters that Darwen has any case at all.

ELECTRIC LIGHTING MEMORANDA.

Opposition to the London Electricity Bills—The Land of the Gas Companies—Questionable Schemes Rejected—the Northumberland Clause—The Electricity Supply Bill Resuscitated.

Long before the sittings of the Lords Committee had ended last week, the countenances of the whole of the members wore an excusably bored appearance. The week passed, and still the Administrative County of London and District Electricity Supply Bill was under consideration; but the end of the cases for and against that particular measure is near—at the rising of the Committee on Friday, Mr. Fitzgerald, K.C., being in the midst of his reply for the promoters. The opposition monopolized most of the week's sittings; and only a sense of justice to the big existing interests involved could have induced their Lordships to listen to the continual reiteration. The cases of the local authorities, London and Suburban, had a marked resemblance, and so had those of the Companies; but the numerous concerns were all allowed an individual innings. It was only, however, where locality, price, or business method created variation that dulness was temporarily dissipated. The pivot of the argument was, of course, the injustice of permitting competition with existing concerns in which large capitals have been sunk—seeing that the works have been constructed for the express purpose of meeting all the necessities electrical of their respective areas of supply. The promoters, while relying upon the parliamentary powers granted to similar Provincial concerns in times past, have the difficulty to surmount that power supply in areas in which existing concerns are operating is in most cases, if not in all, excluded; while this Bill is asking for immunity from any such restriction, and, moreover, contrary to the Electric Lighting Acts, the local authorities' rights as to purchase of the undertakings at stated periods are deliberately excluded. One feature of the proceedings last week was the extraction from witnesses of the variation in the prices charged for public electric lighting in London.

Of more immediate interest to us, however, is the fact that on Thursday afternoon, the South Metropolitan Gas Company and the Gaslight and Coke Company had a hearing on the question of the proposed compulsory acquisition of lands at present in their possession at East Greenwich and Fulham—a matter upon which comment was made in our editorial columns a fortnight since. Evidence was given by Sir George Livesey in respect of the East Greenwich land; and naturally he strongly objected both to the South Metropolitan Company being deprived of their property, especially for the convenience of a competitor, and to the granting of wayleaves to the Electricity Company. What Mr. Balfour Browne very correctly described as a monstrous thing happened at this juncture. After the Gas Company had been put to all the expense of opposition, and had kept Counsel in attendance throughout the Committee proceedings, it was announced by Mr. Fitzgerald that the promoters did not propose to insist on the acquisition of the land; but all they required was an easement over the Gas Company's land and running powers over the railway siding which the Company intend to construct. A feint of this kind over such a serious matter for the Gas Company is, to say the least, reprehensible. But better this than the loss of the land. The land in question is that which was acquired under the Company's Act of 1902; and it will be remembered what an ado Messrs. Redpath, Brown, and Co. then made regarding the Gas Company's very reasonable requirement to purchase a part of their foreshore. What the Gas Company wanted is precisely what Messrs. Redpath, Brown, and Co. are not objecting to this Electricity Company having—there being a very traceable connection between gentlemen allied to the administration of the firm and gentlemen associated with the promotion of this big electricity scheme. But the easement which the promoters are asking for from one side to the other of the land acquired in 1902 for the purposes of their cables, is a repulsive proposal to the Gas Company; and it is a preposterous thing to suggest taking a main artery from a large electric generating-station midway through a gas-works in this manner. Though there is nothing in the present Bill about it, there is no very serious objection to the Electricity Company having running powers over the Gas Company's siding on agreed or arbitration terms, though doubtless the latter would prefer to be left to its free enjoyment. The people who accused the Gas Company of unreasonableness two years ago are themselves this year parties to still greater unreasonableness as against the Gas Company. Counsel for the Gaslight and Coke Company also made a strong protest in respect of the promoters' projects as to the lands at Fulham. By the way, it was a smart thing making public application last week for capital for the Durham Electric Power Distribution Company, Limited, in the management of which the Merz family have a large interest. The Engineer for this grandiose scheme for London bears that name.

The Local Government Board are continuing to teach local authorities that the duties of the central body are of a judicial nature, and that in the performance of those duties there must be no fear or favour. It is some time since that we called attention to refusals of the Board to grant loans for the execution of schemes that they were convinced were neither good in design for the particular districts, nor held the prospect of freedom from financial injury to the ratepayers. The Board last month brought their restraining hand down on two Local Authorities—those at Penrith and Boston (Lincs.). In the case of Penrith, the loan was for only £6850 for the carrying out of a new scheme. But the Board would not entertain it; and they did not mince their words over it. They told the Council as pointedly as possible that they had not shown the undertaking would be a success; and something more would be wanted before the Board would be satisfied that the Council would be justified in proceeding with the scheme at the present time. But the refusal of a loan to Boston is a still happier sign of the intention of the Board to protect ratepayers against municipal speculation and infatuation; and it embraces an official recognition of the cheapness of gas in relation to electric lighting for public purposes that should be carried with full weight to every corner of the country. The Council asked for £20,000. The Board have informed them as to their dissatisfaction on the head of financial success; and among the points the Council are advised to consider is that of the probable addition to the expense of public lighting. The remarks of the Board are too good to lose; and therefore we will give them *in extenso* rather than paraphrase them, and perhaps incur the accusation of distortion: "The substitution," observe the Board, "of electric lighting for the present system of gas lighting in many of the streets would admittedly entail a considerable increase in the public expenditure on lighting; but it was not satisfactorily shown that there would be any material improvement in the lighting of these streets, and, looking to the arrangement of the arc lights shown on the block plan, it is even possible that the illuminating effect of the electric light might be inferior to that of the present method of lighting by gas." There is a compliment here for the Boston Gas Company, and testimony is borne to the economy of public lighting by incandescent gas-burners. It is time that someone assisted local authorities to a proper appreciation of this point. Readers will not be astonished to learn that, in view of the Board's letter, the Corporation have decided to reconsider the whole question very seriously. There will have to be a radical remodelling of the scheme before the Board will be induced to budge from their proper attitude of ratepayer protectionists.

There appears to be a disposition on the part of electrical promoters to give up the fight over the introduction of the Northumberland clause into Bills and Orders conferring powers in connection with electricity supply. One of the principal of our electrical contemporaries some time since advocated that this should be done, on the grounds that the revised clause could do no possible harm to an undertaking, and its acceptance would mitigate the expensive disputation which has grown up—and of necessity—around the applications of local authorities for electricity powers. Some promoters are quite in agreement with this view; and the Ealing Corporation are among them. In the Bill which they have in Parliament this session, they are asking to be invested with manifold powers aiming at the promotion of new business among them in respect of the supply of electrical fittings, through a contractor, but not otherwise. The Brentford Gas Company moved in the matter, whereupon the Corporation consented without a contest to the insertion of the Northumberland clause in the Bill; and the Police and Sanitary Committee of the Commons have endorsed the arrangement. Reference is made to the precursor of the Northumberland clause in the editorial columns; and there it is shown how the former could be, and has been, rendered practically nugatory through the public lighting, and how the clause which displaced the Bermondsey form last year assures that no greater charge shall be made per unit of electricity for public lighting than to large private consumers. If this is not made an absolute condition, then what has happened in Bermondsey and Poplar will be occurring elsewhere. In both these London districts, the amount charged per unit of electricity used in the public lamps is more than the average price obtained from the whole of the private consumers. This being so, some of the latter must get their electricity at a low rate indeed; and it is these people—the most influential and prosperous—who profit by what is taken out of the ratepayers for the electric lighting of the streets. The practice is indefensible. There are many mysteries about the business of electricity supply; and this is one of them. The worship of that divinity the load-factor is manifestly not conducted in such places as

Bermondsey and Poplar with due reverence; and that is a matter which should be taken into account by the ratepayers. Not that we have any belief in this load-factor fiction of the electrical industry. As Professor R. H. Smith has pointed out, the load-factor is not peculiar to the electricity supply business. It could be applied to omnibuses, restaurants, railways, gas-works, and many other industries. But making the load-factor the base of charge has, says the Professor, "never been attempted in any of these industries, and would not be tolerated if tried."

We have not heard the last of the Electricity Supply Bill, to which frequent allusion had to be made last year. It is being revived this session—the formality of introduction having taken place in the House of Commons last Thursday. Mr. Bonar Law has charge of the Bill on behalf of the Board of Trade; and it is being introduced precisely in the form in which it left the House of Lords. Information as to its contents will therefore be found in the explanatory article which appeared in the "JOURNAL" on Aug. 2 last. It is a remarkable measure, furnishing points upon which everybody interested in the subject can hang approval or objection, no matter which unit of the electricity-supply trinity he represents—the ordinary company, municipal, or power service. The worst feature of the measure perhaps is that it will, if it passes, enable local authorities to secure by way of Provisional Order from the Board of Trade powers of a very far-reaching character, without very much trouble, and without the liability of encountering much opposition or revision. Rough-shod riding by municipalities over ratepayers is getting an all too common occurrence; and the ratepayers are suffering to-day, partially in consequence of this, from an extraordinary rate-burden. In the Bill as it stands, provision is made for the compulsory acquisition of land for generating stations (protection has been accorded to gas undertakers against this); the breaking up of streets, &c., outside the area of supply; and supply in bulk. There are also clauses referring to the right of local authorities to purchase; as to the exercise of electric lighting powers by authorities jointly; regarding the consents of local authorities in respect of the grant of Provisional Orders; and provision for the revision of maximum prices. Other matters are also dealt with. If the contention that the Lords experienced last year over this Bill is repeated this year in the Commons, electricity affairs will this session occupy a bulky share in the parliamentary records.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 118.)

THE Stock Markets, after opening fairly firm last week, perceptibly gave way; and continued to weaken up to the close. Several factors united to produce this tendency. Too many new issues—all candidates for cheap money—have rather overstrained the position, and imposed the necessity of a pause for recovery. Then, although the Market did not seem to take much heed of the Kaiser's redoubtable Morocco exploit, political affairs produced anxiety; and the Brighton election set some people forecasting the date of the general election. Altogether, the financial atmosphere was disturbed; and the barometer of prices fell. In the Gas Market, business was in point of volume about on a par with the preceding week, with bursts of activity succeeded by lulls of inaction. The general tendency was, on the whole, not so firm as we have been accustomed to note of late, and it appeared to be affected by the feeling which prevailed in the leading departments. This produced a slight reaction in the two chief issues. But, apart from these, several issues of lesser magnitude effected some nice improvements in their quotations; and outside the market there appears to be no want of alacrity on the part of the public to take up any fresh issues that are offered them from time to time. In Gaslight and Coke, the ordinary stock was fairly brisk; but prices became slightly easier as the week proceeded. The best figure at which stock changed hands was 99 on Tuesday and Wednesday; and the lowest was 97¾ on Saturday. The secured issues were little dealt in. The maximum was done at 92 to 93¼, the preference at 112, and the debenture at 90½. South Metropolitan was moderately active; and here again there was a slight shrinkage in prices as the days progressed. The best was 129¾ on Tuesday, and the lowest 128—the final mark on Saturday. The debenture changed hands once at 90½. Commercials continued very quiet. The 4 per cent. was done at 116 and 116½, and the 3½ per cent. at 112 and 112½. The Suburban and Provincial group showed a little more animation. Alliance old advanced, and ditto new marked 15¼. Bournemouth "B" was done at 17. Brentford old changed hands at 248½, ditto new at 188 and 189, and ditto debenture at 106. South Suburban marked 122½, and Bromley debenture 94¾. The Continental Companies were quiet. Imperial prices ranged from 219 to 221. Union was done at 111 (a fall of 2 points), and European part-paid at 15⅜ and 15½. Both issues of the latter advanced. Cagliari marked 26½ and 26⅝, and Tuscan 10 1/16 and 10⅛. Among the remoter undertakings, Bombay again advanced; and the old shares were done at 7 and 7⅛. Cape Town marked 17½, and ditto debenture 53⅝. South African was done at 16¾. Buenos Ayres realized 12¾, and River Plate 13¼ and 13⅜. The debentures of each Company advanced a point. Primitiva ordinary marked 6 3/16 and 6 5/16, ditto preference 5⅛ and 5 3/16, and ditto debenture 96¼ and 96¾; Monte Video, 12; and San Paulo, 13 3/16 and 13¼. Melbourne 4½ per cent. bonds marked 102⅜.

PERSONAL.

At the meeting of the Institution of Civil Engineers last Tuesday, Mr. A. E. BROADBEBRY, of Tottenham, and Mr. Douglas H. HELPS, of Reading, were elected associate members.

Mr. SAMUEL MILNE, the Engineer and Manager of the Aberdeen Corporation Gas Department, was married at St. Ninian's Parish Church in that city, on Wednesday last, to Priscilla, youngest daughter of the late James Hosie, of Midmar, Aberdeenshire.

Mr. ALBERT FORD, the New Zealand Manager for the past two years of the Welsbach Light Company of Australasia, Limited, who recently retired from their service to take up consulting work, has been presented with a handsome souvenir and address from the employees, as a mark of esteem and goodwill.

At the recent annual meeting of the Isle of Sheppey Gas Company, reference was made to the retirement of Mr. W. T. CARPENTER, the Company's Engineer, who has been with them for 47 years, and under whose supervision the works were built. The shareholders unanimously endorsed a recommendation to grant him a retiring allowance of £100 per annum.

Mr. JOSEPH WENTWORTH, the Chief Assistant to the Portsea Island Gas Company, has obtained the position of Manager of the Aldershot Gas and Water Company, in succession to Mr. Lewis, whose resignation was mentioned last week. Mr. Wentworth served an apprenticeship with a firm of general engineers in Birmingham, and for seven years was one of the outdoor engineers with Messrs. S. Cutler and Sons. He was for four years Works Inspector at the Hull station of the British Gaslight Company, and has been almost as long with the Company he is now leaving.

Of the number of candidates for the position of Manager of the Banbury Gas Company, in succession to Mr. W. R. Cooper, for which applications were invited in the "JOURNAL" a few weeks ago, two were selected as being most suitable, and the choice of the Directors has fallen upon Mr. WALTER R. WILSON. The successful candidate is 28 years of age, and was articled pupil and assistant at the Kendal Gas, Water, and Electricity Works, under Mr. T. N. Ritson, where the make of gas was about 70 millions. He was for rather more than two years Assistant Manager at Colne, under Mr. F. Thorpe, and has been for three years Assistant Engineer and Manager at the Warrington Gas-Works, under Mr. W. S. Haddock, where the make of gas is 400 millions. He studied gas analysis under the late Mr. G. E. Stevenson, of Manchester, and holds a number of certicates from South Kensington. He passed with honours the City and Guilds of London "Gas Manufacture" examinations. We cordially wish him a successful career.

OBITUARY.

Mr. WILLIAM SCOTT, the Manager of the Blantyre Gas Company, died at his residence in the town on Thursday morning, in his 50th year. He had been at Blantyre for about fifteen years, and had been unwell for a considerable time.

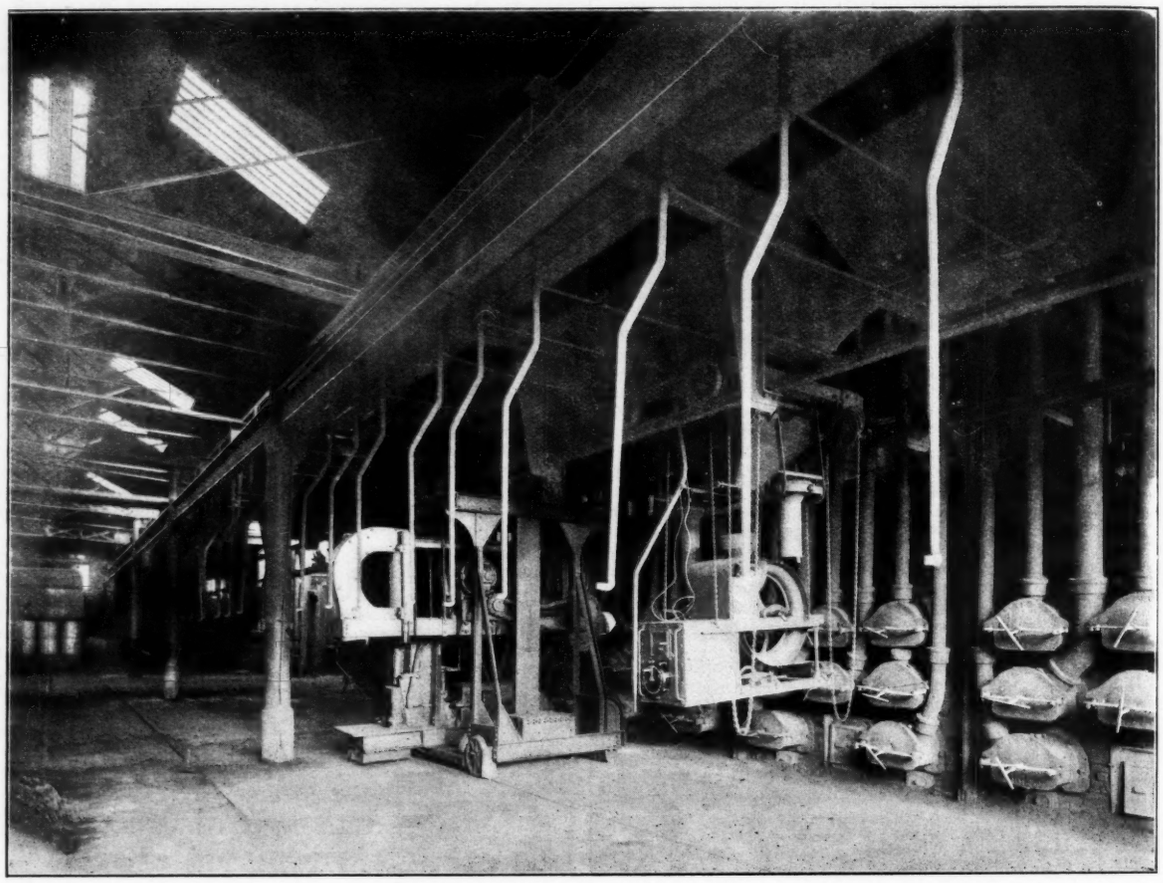
The death occurred on the 2nd inst., in his 70th year, after an illness extending over about three years, of Mr. JOHN WILSON, of Longtown, Cumberland. Deceased was for 13 years Secretary of the Longtown Gas Company, and for one year less of the Industrial Co-Operative Society. He was also Secretary and one of the founders of the Literary and Scientific Society 27 years ago; and he associated himself with the starting of the Temperance Society 23 years earlier. He was an active worker in every movement having for its object the cause of temperance and the benefit of his fellow-man. The funeral took place last Wednesday, and was largely attended; the deceased being well known and much respected.

Memorial to the Late Mr. H. A. Willey.

A memorial tablet was unveiled last Saturday, in St. Thomas's Mission Church, Exeter, to the late Mr. H. A. Willey. The tablet is of yellow Devon marble, surmounted by Mr. Willey's crest and motto, "Lucet et Lucibet." The inscription reads: "Sacred to the memory of Henry Alfred Willey, born 4th July, 1863; died 21st September, 1904. This tablet was erected by the employees of Willey and Co., Ltd., as a mark of affectionate regard. During the ten years he presided over the firm he was ever ready to encourage by word and deed all those associated with him to reach a higher, moral, mental, and physical standard." The unveiling was performed by the Rev. J. H. Prince, Vicar of St. Thomas's, who referred to Mr. Willey's commanding ability, and spoke of the amicable relations which always subsisted between his workmen and himself.

Yorkshire Junior Gas Association.—The next meeting of the Association will be held on Saturday, at the Leeds Institute, when a paper on "The Valuation of Gas Coals" will be read by Mr. A. Edwards, of Leeds.

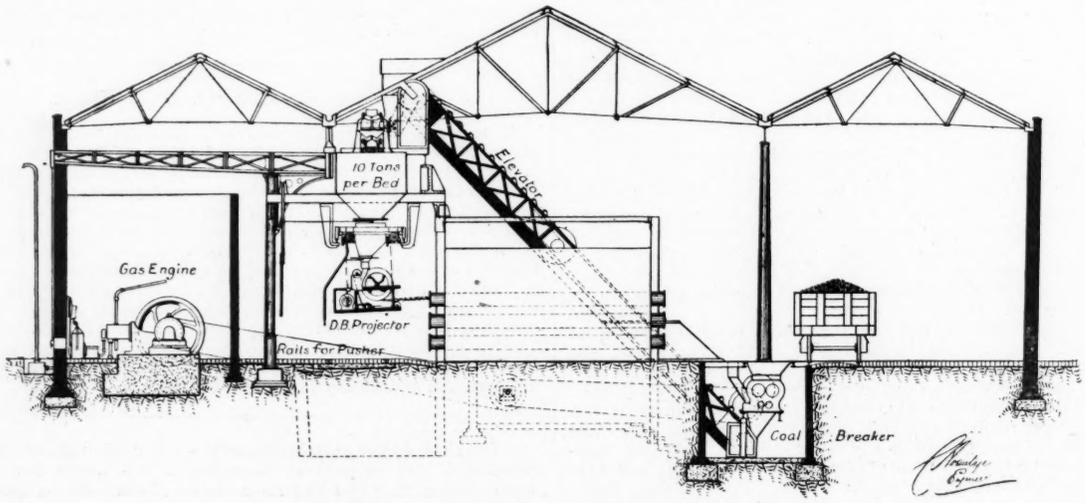
DE BROUWER CHARGING AND DISCHARGING MACHINES AT LANCASTER.



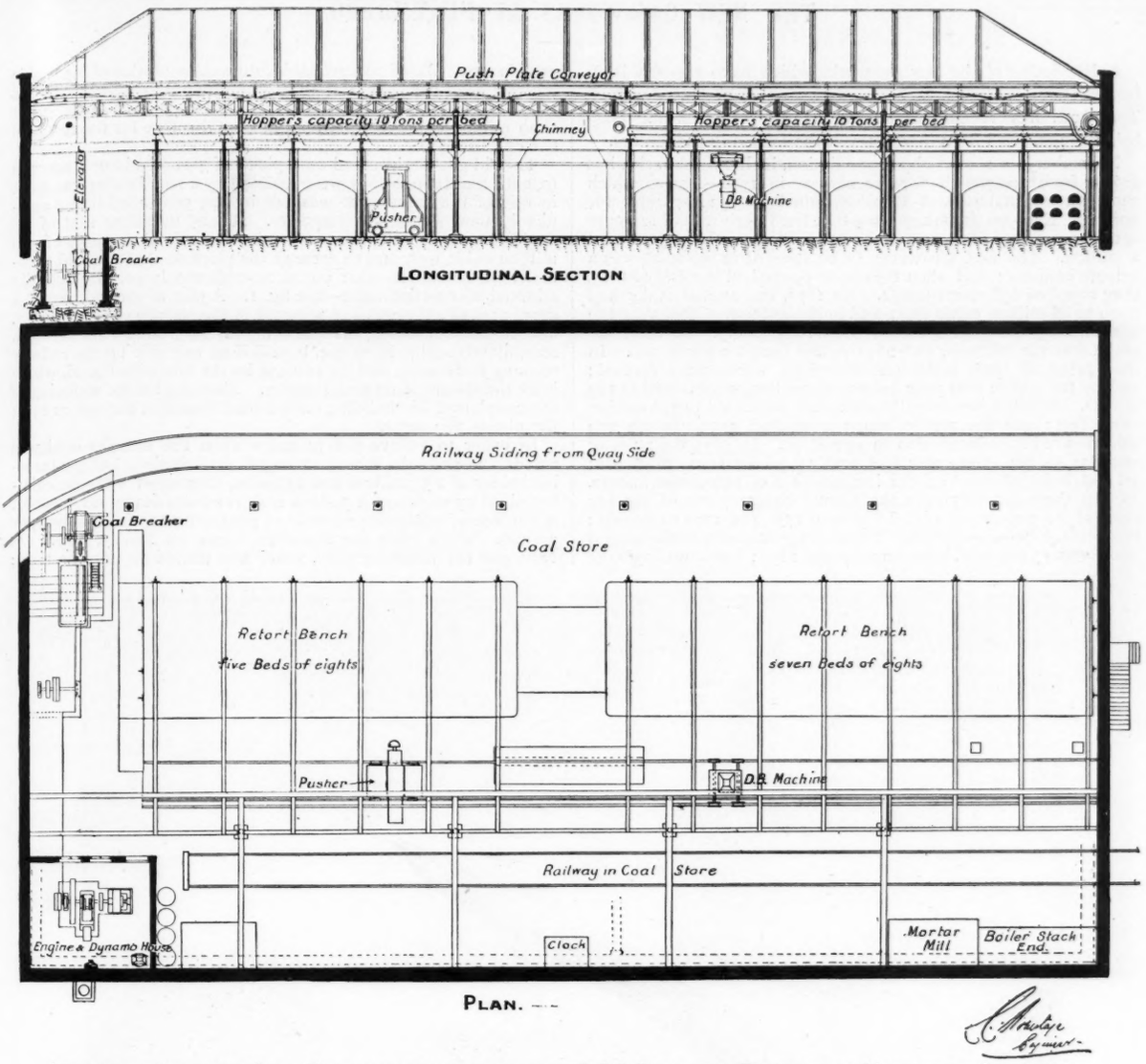
Among the extensive reconstruction and enlargement work of late carried out at the Lancaster Corporation Gas-Works, to the plans and under the direction of Mr. Charles Armitage, F.C.S., Assoc.M.Inst.C.E., the Engineer and Manager, is an installation of De Brouwer charging and discharging machinery, which has now been put into successful operation and is giving eminent satisfaction. We reproduce a photograph which Mr. Armitage has kindly supplied, and two sheets of drawings of the retort-house arrangements.

The introduction of the stoking machinery at the works necessitated several alterations to the retort-house. The greatest difficulty that presented itself was the roof, which covered the house in three spans, and a row of columns within 11 feet of the front of the retort-bench. This space was insufficient to instal the machines; and so recourse was had to fixing a longitudinal lattice-girder the whole length of the house—directly under the cast-iron roof girders—with the ends resting in the gable walls. Together with this were four latticed cantilevers, secured at one end to the longitudinal girder; the other end being built into the retort-house wall and held down by anchor bolts, secured to cast-iron brackets built in the base of the wall. The cantilevers were supported by four cast-iron columns fixed about 16 feet from the front of the retort-bench.

The coal is delivered into the retort-house in trucks, emptied direct into a coal-breaker, or into a bye-pass shoot, if not required to be broken. It is then elevated into a push-plate conveyor, and deposited into a continuous hopper divided into twelve compartments—one to each bed of retorts. Each compartment is capable of holding 8 tons, or a total of 96 tons for the twelve beds. There are three outlets arranged central (vertically) with each tier of retorts, fitted with a pair of slides and a sliding door, and worked by a hand lever.



Cross-Section of the Retort-House at Lancaster.



ARRANGEMENT OF THE COAL HANDLING PLANT WITH THE "D.B." PROJECTOR DISCHARGING MACHINE AT LANCASTER.

The charging-machine is suspended by chains from an overhead travelling carriage. It can be raised, lowered, and adjusted to the height of the various tiers of retorts. A measuring chamber is fixed on the top, fitted with an adjustable hinged plate on the inside to regulate the quantity of coal to be charged into each retort. The travelling carriage runs upon a double line of steel flange rails, the entire length of the retort-bench. The discharging machine, fitted in a steel framework of channels, angles, and plates, is propelled along the full length of the retort-house floor on rails, and similar to illustrations given in the "JOURNAL," March 14, pp. 698, 699. Both machines work on one side of the retort-house, charging and discharging 20-feet through retorts.

The coal plant is driven direct by a gas-engine of 33½ brake horse power. The charging and discharging machines are electrically driven by a dynamo capable of developing 9 kilowatts at 220 volts, coupled direct to the engine.

On the opposite side of the retort-house to that on which the machines work, it is intended to erect a coke-conveyor, thereby minimizing hand labour as much as possible. This conveyor will also be driven by the gas-engine, which is of ample power.

The charging-machine has now been in operation for about six months doing excellent work. The charges are very good and uniform in thickness throughout the whole length of the retort. The discharging-machine has only been in use for a few weeks; and it is also doing its work admirably. Both machines are worked by old stokers. The cost of carbonizing has already been considerably reduced; but it will be lowered still further when the whole labour-saving installation above referred to is completed.

Mr. Armitage writes, in regard to his experience with the machines, that the installation—particularly the coal projector—has brought about great changes in the production of the constituent members of the volatile products. Tar has certainly suffered in value; but the gas has considerably improved in quality. These changes without doubt are due to the uniform thickness, and the absence of density, of the charge. The machine can be so regulated as to deliver the coal into the retort quite loosely—without packing—thereby assisting carbonization. This is favourable to the production of an increased yield of gas of a higher illuminating power, and a diminution of tar products.

Grounding Wires on Gas-Pipes.

This was the subject of a short paper read at the last meeting of the New England Association of Gas Engineers by Mr. E. H. Yorke, the Engineer of the Portland (Me.) Gas Company. He pointed out that before the advent of the electric light, with its high-tension currents, no serious disadvantages followed from the practice of grounding telephone and electric bell wires on gas-pipes. With the introduction of this light, however, new and dangerous conditions were created. He gave a few instances of trouble which had occurred in connection with his Company. A jobber placed his wrench on a meter union to remove the meter, when the next minute he found himself on the floor. Another jobber, when about to do some burner work, was severely shocked. A consumer tried to change a burner, but could not do so because of the fitting being heavily charged with electricity. These accidents admonished him that a continuation of these conditions would operate to the Company's disadvantage, and, with the view of correcting them, he had an inspection made of all consumers' meters and piping. The reports of these officers showed hundreds of instances of wires grounded on gas-pipes and electric light wires in dangerous contact with these wires. All these cases were reported to the City Electrician, who caused orders to be sent for the removal of these sources of danger. The Insurance Inspector also co-operated; and a better order of things ensued. There was, however, one consumer who did not promptly obey the mandate of the Electrician, and the result was somewhat disastrous. During a severe thunderstorm, the lightning followed the wires, melted three holes through the gas-pipe, ignited the gas, set the building on fire, and destroyed considerable property.

THE NEW GAS-WORKS AT NUREMBERG.

A description of the new gas-works which have recently been brought into operation at Nuremberg, written by Herr Rudolph Terhaerst, has recently appeared in the "Journal für Gasbeleuchtung," and from it we extract the following particulars.

Nuremberg is a city whose population, including suburbs, has grown from 109,700 in 1875 to 261,000 in 1900—figures which show an unusual rate of increase, equal to 3·52 per cent. per annum. Even on the assumption that the future rate of increase is only 3 per cent. per annum, the population will by 1950 exceed a million. The first gas-works to be erected in the town was a private concern; and when they were opened, at the end of 1847, they supplied 638 street-lamps. By 1871, the annual make had risen to 88 million cubic feet; and in the autumn of that year the undertaking was purchased by the Municipality. In 1891, the make was 250 millions, and 2640 public lamps were in use. In the spring of 1896, municipal electricity works were opened; and by the end of that year only 2768 gas-lamps remained in the streets. By 1898, however, the make had increased to 376 million cubic feet; and the public lamps numbered 3159, though 259 electric arc lamps were also in operation. In 1899, the price of gas was 5s. per 1000 cubic feet, and 3s. 4d. for trade purposes; 3s. 10d. being charged on the introduction of automatic meters. During the years 1887-1900, the annual consumption of gas per head of the population varied between 1750 and 1970 cubic feet; the average being 1830 feet. The average increase in the annual make was 4·3 per cent. between 1887 and 1898; but it was 15·6 per cent. in 1900. Based on a probable future consumption of 1950 cubic feet per head per year, and an expected population as mentioned above, it was considered that gas-works capable of turning out 2120 million cubic feet per annum should suffice for the needs of the city till 1950.

The old gas-works stood on a piece of ground about 4 acres in extent; and though they were assisted by a small water-gas plant in one of the suburbs, it was felt by the year 1898 that a completely new works was requisite. It was therefore first of all decided to erect a new station having an annual capacity of 530 million cubic feet, and to arrange the plant so that it could eventually be doubled in size; but afterwards the larger size actually adopted was settled upon—see fig. 1. A plot of ground having a gross area of 43½ acres was selected in the suburb of Gibitzenhof, near Sandreuth, which, as the accompanying ground-plan shows, is roughly triangular in shape, bounded on one side by the railway running to Munich, and on another by the Ludwigs Canal, which joins the Rivers Main and Danube. Allowing for the widening of the canal, and for building on the road frontage, the net area of the plot is 36·3 acres.

In order to relieve the pressure upon the old gas-works as rapidly as possible, it was arranged first of all to build a three-lift holder of 1·55 million feet capacity, connected with the existing plant by means of a 39-inch main, and simultaneously to erect a water-gas installation capable of producing 175 million feet per annum. Work upon the gasholder began on Nov. 5, 1900. On Nov. 9 of the following year, water was turned on into the tank;

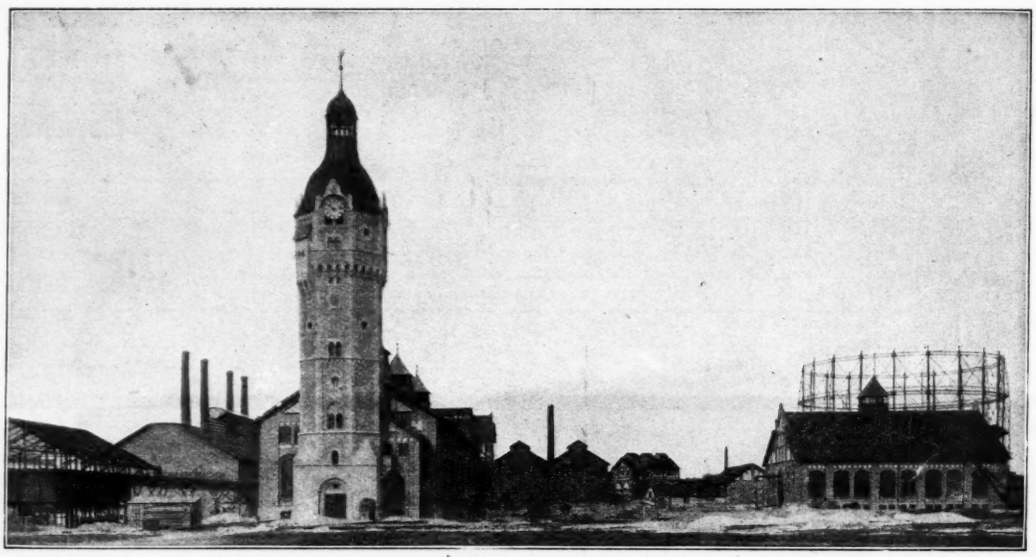


FIG. 1.—GENERAL VIEW OF THE WORKS.

3½ million gallons being taken from the city mains. An air test of the holder began on Nov. 21, lasting for five days; and finally, on Nov. 30, gas from the old works was introduced.

THE WATER-GAS PLANT.

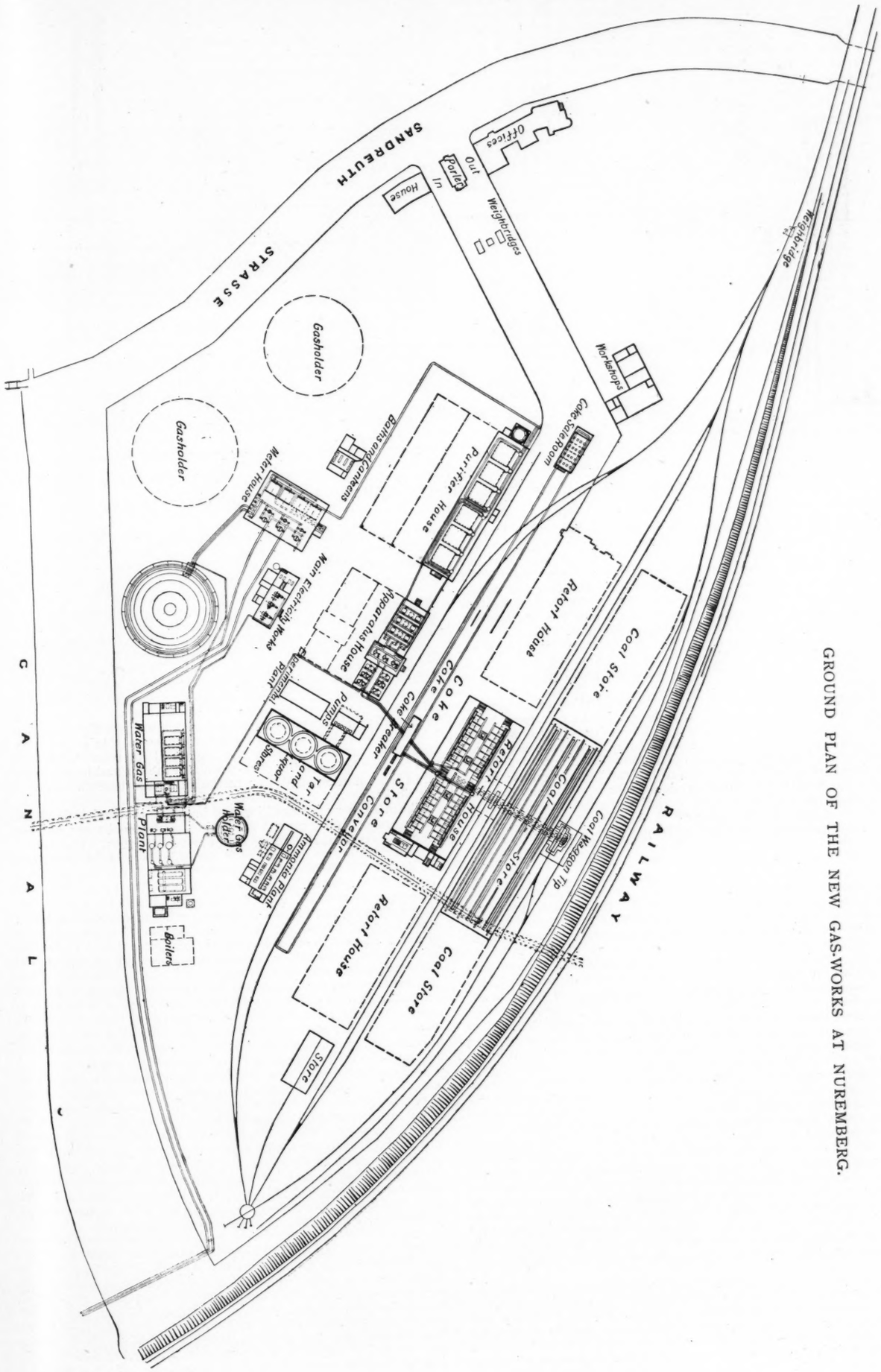
The water-gas plant is erected in two different buildings, one of which contains the generators, condensers, boilers, pumps, coke-store, and an electric light and power installation; while the other contains the purifiers, meter, governor, carburettors, and a room for the men. The former building, of which a section is shown in fig. 2, is divided into three rooms. The generators and condensers are arranged in the centre portion. So far two generators, each having an hourly capacity of 9000 or 10,000 cubic feet, have been laid down; but space is left for the producer still in the old gas-works (which is double the size mentioned), and also for a new one of 20,000 feet capacity with its accompanying scrubber. The generators are of the Dellwik-Fleischer type. The coke-store is on the left of the building. The trucks coming from the coke-store of the gas-works proper are raised by an electric lift to the top storey, a height of 37 ft. 9 in.; and their contents are then discharged into the hoppers. Underneath the hoppers a floor 12 ft. 9 in. above ground level supports the trucks that convey the coke to the generators. In the right-hand portion of the building are the boilers which raise steam for the generators and for certain of the machinery. The boiler-furnaces are fed with waste coke.

The same building contains a pump, which lifts water into an elevated tank, whence it flows to feed the boilers and the water-gas scrubbers. These scrubbers are placed at a considerable distance from the generators, in order that the water in them may not be raised in temperature by the radiant heat of the gas-producers. The generators are also coated with lagging. From the scrubbers, the gas passes through a 16-inch pipe to a special holder, which at present has a capacity of 35,000 cubic feet, but is so arranged that eventually it can be doubled in size by telescoping. The left-hand portion of the buildings contains the blowing engine for the air required by the generators, and also an exhauster for the gas. This draws the water gas from the special holder and coal gas from the main coming from the gas-works, forcing them, mixed together, through the purifiers and a meter into the large holder mentioned above. From the large holder, the gas returns through a 24-inch main into the works, whence it is either sent back to the old gas-works, or passed through a benzol carburettor and two governors into the 39-inch city main. The pump, blowing engine, and exhauster are driven by steam power. In a room attached to the boiler-house is a small electric light and power plant, the dynamo being driven by a 30-horse power water-gas engine; and in another building is a battery of electrical accumulators.

In the second water-gas plant building, four purifiers, with a superficial area of 345 square feet each have been erected. Travellers are provided for removing the covers of the purifying vessels, and for carrying the material to the revivifying floor. The two main buildings are connected by means of a covered way.

EXPERIMENTS WITH THE WATER-GAS PLANT.

When the water-gas plant was ready, tests were carried out on behalf of the builders on three separate days; the runs lasting for ten hours, and being performed with both generators. The generators were freshly clinkered before each test, and were supplied with coke containing on an average 10 per cent. of ash. The average yield of gas was 88,400 cubic feet, or 38·8 cubic feet per pound of carbon gasified in the generators. The average amount of carbon dioxide in the gas was 5·2 per cent., and the



GROUND PLAN OF THE NEW GAS-WORKS AT NUREMBERG.

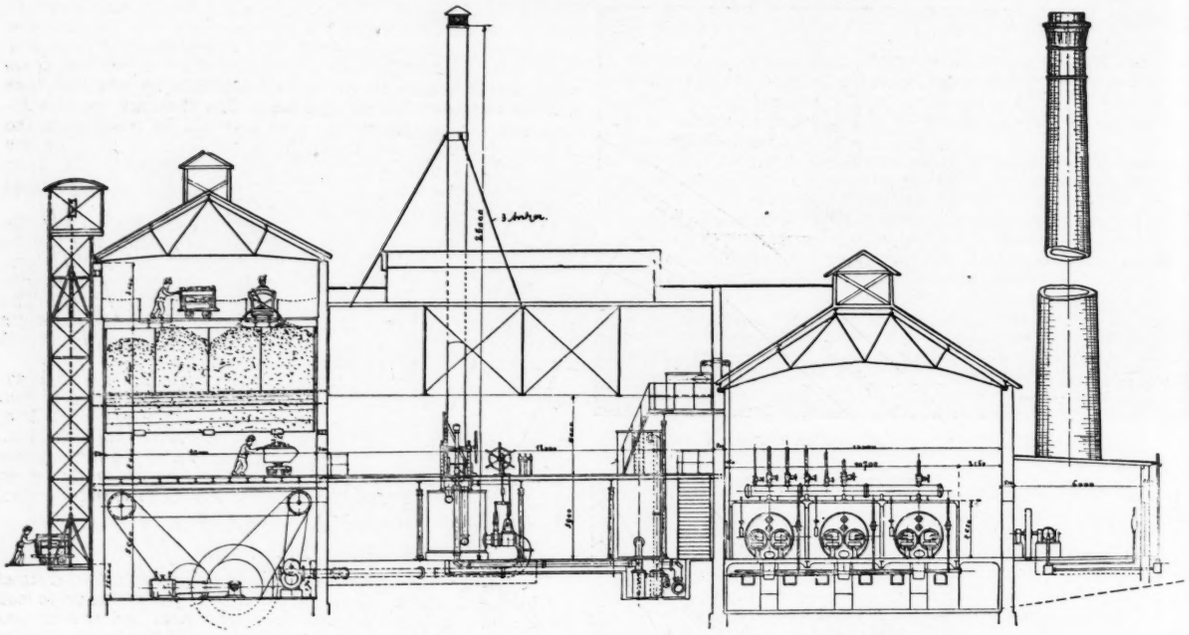


FIG. 2.—SECTION OF BUILDING CONTAINING THE WATER-GAS GENERATORS, &c.

average net calorific value was 71 calories per cubic foot at 0° C. and 760 mm. When the plant was taken into regular work, the monthly make of gas varied from 33·8 to 38 cubic feet per pound of "fixed carbon" in the coke; the average make being 27·3 cubic feet per pound of coke, or 36 cubic feet per pound of carbon put into the generators. The proportion of carbon dioxide ranged from 4·2 to 6·8 per cent.; and the average net calorific value was 72 calories per cubic foot. On an average, the gas contained 51·6 per cent. of hydrogen, 37·3 per cent. of carbon monoxide, 0·6 per cent. of methane, 5·6 per cent. of carbon dioxide, 4·6 per cent. of nitrogen, and 0·3 per cent. of oxygen. Its specific gravity was ·529.

Experiments having shown that the proportion of carbon dioxide in the gas increased with the length of the run up to 14 or 16 per cent., an investigation was made into the effect of shortening this period. When the blow lasted 45 seconds, a water gas containing from 4 to 5 per cent. of carbon dioxide could only be prepared by reducing the length of the run to 5½ minutes; but it was also found that, when other conditions remained the same, the proportion of carbon dioxide varied according to the quality and size of the coke, the pressure of the steam, the speed of the gas, and the height of the fuel in the generators. Finally, it was ascertained that most favourable results were obtained with a blow of 45 seconds and a run of 6½ to 7 minutes. In these circumstances, each generator gave 10,000 cubic feet of water gas per hour; the loss of carbon during the blows and during clinkering being between 40 and 45 per cent. In all these tests, the generators were first charged to a depth of 4 ft. 3 in. with 12 to 14 cwt. of coke; quantities of 2 cwt. being afterwards introduced on an average every 40 minutes. The mean speed of the air during the blow was 62 feet per second, calculated on the area of the empty generators. The amount of steam used was kept the same in all tests; a perforated metal plate being fixed in the main before its entry into the generators. The fire-bars were clinkered every twelve hours, and the entire generators when necessary (about once a week). The quantity of clinker removed was 12 per cent. of the coke gasified. It was not returned to the plant, but was used under the boilers.

The water gas was first mixed with the coal gas from the old works in the proportion of 9 per cent. of the former to 91 per cent. of the latter; the water gas being carburetted with benzol vapour to the extent of 2½ grammes per cubic foot. The product had a mean calorific value of 138, and an illuminating power of 16 Hefner units. Tests carried out three times a day showed that the process of mixing described above was sufficient to yield a uniform gas. Afterwards the proportion of water gas was raised to 20 per cent.; 3 per cent. of Boghead cannel being gasified at the same time. The calorific value of this mixture was 131·6. So far as has been ascertained hitherto, the cost of making the carburetted water gas is 2·50 pf., and the carburetted gas 3·02 pf. per cubic metre [*i.e.*, 8·3d. and a little over 10d. per 1000 cubic feet].

THE COAL-GAS PLANT.

In preparing the plans of the coal-gas works, special attention was devoted to shortening the distance through which the gas has to travel, to making supervision easy, and to simplifying the transportation of the coal and of the coke. The arrangement of the existing plant is shown in fig. 1 and in greater detail by the ground plan. The clock-tower at the west end of the purifier-house contains an overhead reservoir for the water required throughout the works; the pumps being fitted in the electricity house. The ultimate capacity of the plant is to be 2100 million feet per annum; but from the coal-store to the apparatus house, it will be divided into three sections, of which only one has yet been laid down. Each section is further subdivided into two independent portions; so that when the whole is complete, the works will contain six separate sets of plant, each equal to a yearly make of 350 million feet, which can be operated alone or in combination with any or all of the others. The meter and governor houses, and the ammonia plant, on the other hand, have been already so built as to require no future enlargement. Coal can be brought to the works either by the canal or by railway. The main siding from the latter passes over a weighbridge, and then branches into six roads—two passing the north side of the coal-store, two running between the store and the retort-house, and two passing between the coke-store and the tar and liquor tanks, all of them uniting again in a turntable at the eastern corner of the works.

The machinery for handling and breaking the coal is in duplicate; one set being on the north side of the coal-store, and the other between that building and the retort-house. The loaded trucks, standing on either of the two sidings next the coal-store, are drawn by means of electrically-propelled capstans on to a tipping floor, where they are bodily tipped, the coal falling into hoppers underneath. It is then sorted; the portion which requires breaking passing to the crusher, and the remainder entering other hoppers directly. From these hoppers, the coal drops on to either of two Bradley conveyors, which run side by side the length of the coal-store, across the sidings between the store and the retort-house, and into the centre of the latter building. Each coal breaker and each conveyor has a capacity equal to 40 tons per hour. Either of the two Bradley conveyors may be used to carry the coal from the trucks to the store, from the trucks directly to the conveyor which feeds the different charging hoppers in the retort-house, or from the store to the retort-house; and all three duties can be performed simultaneously.

The coal-store is an iron building 384 feet long by 98 ft. 6 in. wide. It is divided longitudinally into three sections by means of two partitions. The outer walls, as well as the partitions, are fitted with iron doors, so that any portion of the house can be emptied in case of fire. Coal is loaded into the different bunkers of the store from belt conveyors which run lengthwise in the building—*i.e.*, at right angles to the main Bradley conveyors. Only broken coal is taken into store; and the deliveries of different dates can be kept separate. The total capacity of the store is 15,000 tons of coal—about 23 per cent. of the amount carbonized per annum. The bottom of each bunker has a discharging orifice, from which the coal drops on to underground conveyors that take it back to the centre of the building, where the Bradley travellers are. Here automatic striking gear is fitted, which opens the mouth of the conveyor in operation each time a receptacle of the traveller comes underneath, shutting it again when the receptacle is full, until the next arrives at the proper place. There are six of these conveyors which take the coal out of store, three running to either end of the store. They have an hourly capacity of 20 tons each, and are all worked from a single electric motor (through countershafts), which is powerful enough to drive two at a time.

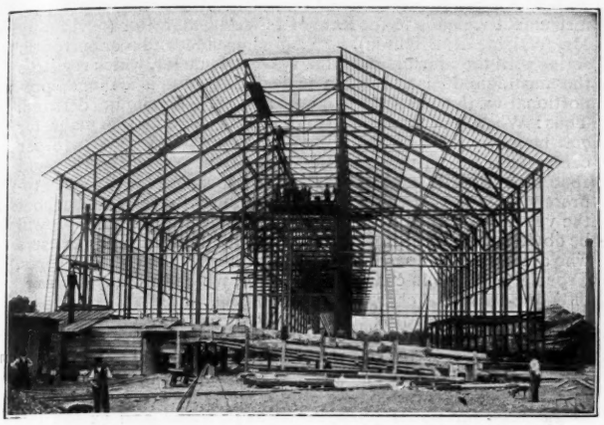


FIG. 3.—THE RETORT-HOUSE UNDER CONSTRUCTION.

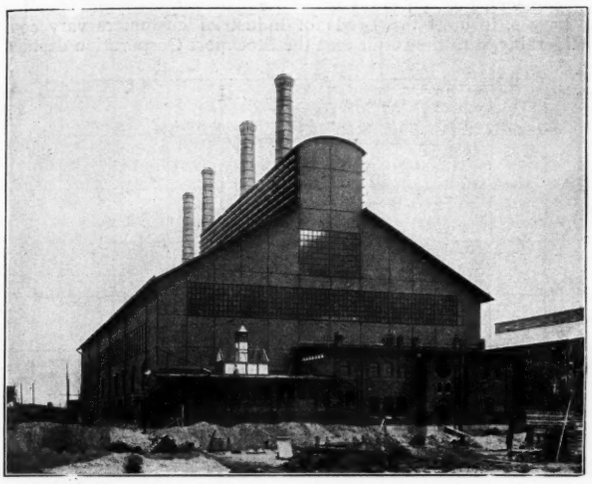


FIG. 4.—THE RETORT-HOUSE COMPLETED.

THE RETORT-HOUSE.

The retort-house (figs. 3 and 4) is an iron structure, shown in section and in end elevation. Special attention has been paid to its ventilation; sliding doors and jalousies being fitted to it. The house contains four benches of retorts, each having eight beds with nine retorts per bed. The retorts are inclined at an angle of 32°, and are charged from little trucks running on an overhead railway; the trucks themselves being filled from the elevated coal-hoppers. When the lower doors of the retorts are opened, the coke falls with a little assistance into De Brouwer quenching troughs, one of which serves each bench of 72 retorts. From these troughs the coke passes into either of two conveyors which run across the length of the house side by side, and take it to the sorting and crushing plant. The crushers are of sufficient size to deal with all the coke that will be made when the two other retort-houses shown in dotted lines on the plan are built; but it is intended, when the proper time comes, to lay down sorting machinery, so that all the coke except that which requires breaking shall pass at once to the store.

The coke-store is a long building arranged parallel with the coal-store, in which the coke is distributed by means of trucks running on an elevated railway. At the west end of the store, opposite the main entrance to the works, is a room provided with weighing and measuring apparatus for the local sale of coke. The breeze is taken to the boilers, and the large coke to the water-gas generators, in narrow-gauge railway trucks. The conveyors and the sorting and crushing plant are driven by electric motors.

Each bed of retorts has its own hydraulic main, but a single 27-inch pipe is employed to take the gas from the whole of two benches. The connections, however, are such that a single bed, or a single bench, can be worked alone or isolated from the rest. At present, there are therefore two mains leaving the retort-house for the condensers; the pipes running across the works in an underground brick conduit, which also contains the water-mains, &c., and is large enough for a man to enter.

THE OTHER PLANT.

The plant in the apparatus-house is arranged in two distinct portions, each having an annual capacity of 350 million cubic feet. Each section is provided with four cylindrical and two tubular condensers, the latter of which can be used as water-condensers when required. The gas is drawn through the condensers by the exhausters, of which three have been laid down. They have a capacity of 106,000 feet per hour when running at 80 revolutions per minute; and they are coupled directly to the steam-engines that drive them. The tar-separators have been erected in duplicate; one being kept in reserve, but coming automatically into action when the other needs cleaning out. The Ledig cyanogen and naphthalene extractor is similarly in duplicate, each having a daily capacity equal to over 2 million cubic feet. In order to decrease the amount of oil diminished in value by absorption of naphthalene in the washer, Herr Terhaerst causes the liquid to circulate through an outside condenser. In this way, part of the naphthalene dissolved in the warm oil is periodically removed, and the liquid is rendered fit for further service. The gas finally reaches the ammonia extractor at a temperature of from 50° to 54° Fahr. The total effective surface of the condensing plant per 1000 cubic feet of gas per day is 7·63 square feet of air-cooled surface, and 3·65 square feet of water-cooled surface. The building is of brick, with a wood and iron roof boarded inside. The pipes lie in channels covered with narrow boards 1 inch apart.

In the purifier-house there are six purifiers, three for each half section of the existing plant. They have each a superficial area of 1076 square feet; and the gas passes through them at a speed of about 14 inches per minute. The machinery for lifting the lids of the purifying vessels, and for raising the fouled material to the revivifying floor above, is electric. Eventually three station meters will be required, and three pairs of governors, as three

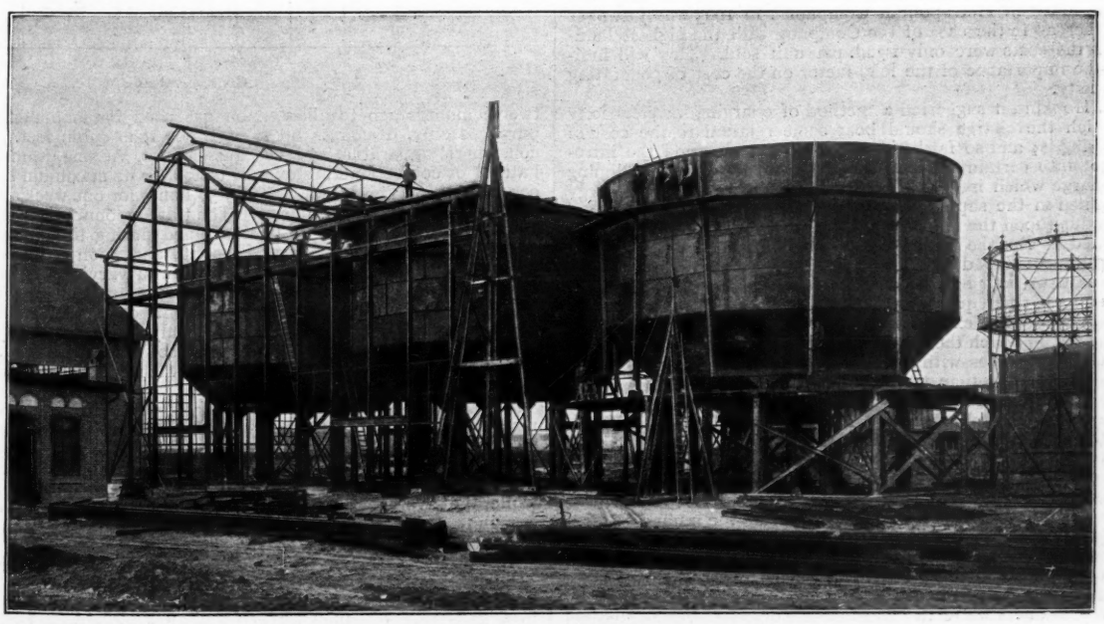


FIG. 5.—OVERHEAD TAR AND LIQUOR TANKS.

39-inch mains are to leave the works in different directions. At present, two meters and two governors have been installed.

As previously mentioned, a gasholder of 1,500,000 cubic feet capacity has been erected on the new works. A second is to be built which will hold 2,700,000 cubic feet when completed, but temporarily it will have only a single lift, and a capacity of about 900,000 cubic feet. Thus the storage capacity of the two holders will be about 69 per cent. of the daily make. When the second one-third of the plant is finished, and the second holder has been telescoped, the storage will be about 60 per cent.; and when the final one-third of the plant is needed, a third holder of 2,000,000 feet capacity will be erected, which will keep the storage capacity of the whole works at approximately the same figure. At present, the 700,000 feet holder on the old works is also available.

The main electricity works, the position of which is shown on the ground plan of the site, contain two gas-engines of 100-horse power each, coupled direct to two alternators of 80 k.w., and one engine of 50-horse power coupled to a dynamo of 40 k.w. The exciters are shunt-wound, and are fed with direct current from the smaller generating station attached to the water-gas plant. The gas-engines in the larger station consume coal gas, those in the smaller station water gas. Gas-engines were selected as the source of energy instead of steam-engines, because the pieces of machinery which absorb most power—*i.e.*, the coal and coke conveyors and separators—are idle at night, so that the demand for current is irregular. The water-gas plant is lighted electrically from its own dynamos; the rest of the works, including the yard, the conveyor-troughs of the coal-store, &c., are supplied with direct current transformed from the alternating current of the main generating station. The boilers of the water-gas plant supply steam to the apparatus and purifier and meter houses for warming purposes. Near the overhead tar and liquor tanks (which are shown in fig. 5) is a plant for manufacturing sulphate of ammonia.

The gas-works were put into regular operation last October.

COMPETITION FOR THE SUPPLY OF POWER.

By J. Ferguson Bell.

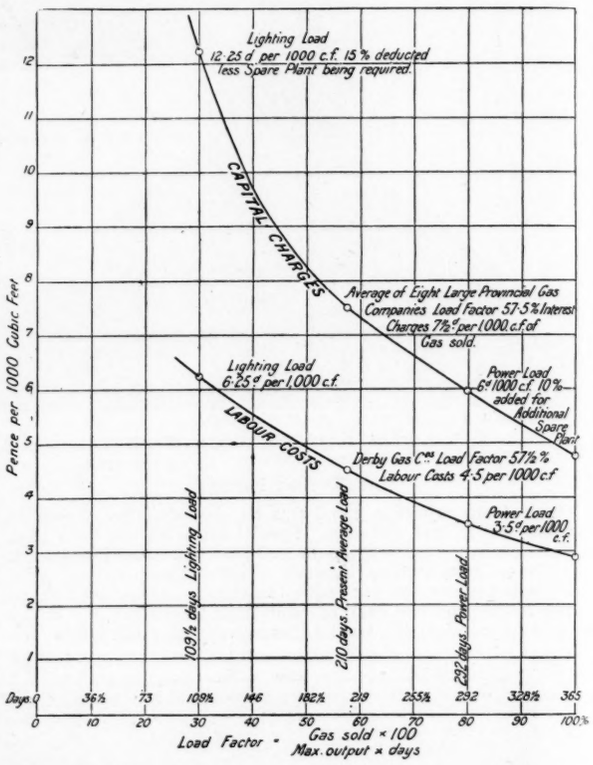
(*Continued from Vol.* LXXXIX., *p.* 769.)

In an address by the late Dr. John Hopkinson, F.R.S., to the Junior Engineering Society, in 1892, on the cost of electric supply, he pointed out that the expenses on an undertaking are divided into two classes. On the one hand, there are expenses which are quite independent of the extent to which the undertaking is used; and on the other, expenses which are almost absent unless the undertaking is used, and which increase in proportion to its use. These are the two extremes, and various mercantile concerns will vary very considerably between them. Again, undertakings differ from each other in another respect—in the manner and the time that the service is required. This has been aptly focussed by Mr. R. E. Crompton in the term "load-factor," which means the number of hours out of the twenty-four that the plant is fully employed, leaving a sufficient margin of spare plant for emergencies. In electric supply records, the load-factor is generally estimated by units sold × 100 ÷ maximum load × hours. The Metropolitan Electric Supply Companies' load-factor varies from 10 to 28 per cent.—the average being about 15 per cent.—and it is interesting to note that the average cost per unit sold for the fourteen Metropolitan Companies in 1903 was just over 2d., whereas in the case of the Company with the highest load-factor the costs were only 1·32d. per unit sold. This will indicate the importance of the load-factor on the cost of generating electricity.

Dr. Hopkinson suggested a method of charging for electricity in which the charge should bear some relation to the cost of supplying it; and so far back as in 1883, he obtained the introduction into certain Provisional Orders of a clause sanctioning "a charge which is calculated partly by the quantity of energy contained in the supply, and partly by a yearly or other rental depending upon the maximum strength of current required to be supplied." But the Orders came to naught, and later the Board of Trade sanctioned and inserted in a number of Orders "for each unit per hour in the maximum power demand, a charge not exceeding £3 per quarter; and, in addition, for each unit supplied a charge not exceeding 2d." This method of charging for electricity, in which the time during which a supply is required is reckoned, applies with very much greater force to the supply of electric energy than to the supply of gas, as in the former a large proportion of the cost is necessarily entailed in being ready to meet the demand, whereas gas is readily and cheaply stored. Consequently the manufacturing plant is independent to a much greater extent of the time during which the supply is taken.

The author in 1896 introduced the maximum demand system of charging for electricity at Stafford; but after two or three years' trial, it was practically abandoned at the request of consumers, in preference to an all-round flat rate, which no doubt is not so equitable a way of charging, but has the merit of simplicity, and consumers can easily check their accounts. The maximum demand system was the source of a good deal of friction, as only those consumers who had a considerable number of units charged at the lower rate were satisfied; and those who did not come within the range were much dissatisfied. In this system, an instrument which is in the form of a thermal ammeter (devised by Mr. Wright, of Brighton), is fixed alongside and connected in series with the consumer's ordinary electric meter, which registers the maximum demand; and a scale of discounts is arranged proportional to the units used compared with maximum demand. Thus: When the consumption equals the maximum demand for 700 hours in the year, 5 per cent. discount; 1000 hours, 10 per cent.; 1200 hours, 15 per cent.; 1500 hours, 20 per cent.; and 1800 hours, 25 per cent. A 5 per cent. discount on the scale represents an average use of about two hours per day throughout the year; and a 25 per cent. discount, of five hours a day. It will be obvious that this system is specially applicable to power users who are long-hour consumers. Yet in the great majority of cases, a special low rate is charged for power, which in many towns is only one-third that charged for lighting.

Perhaps chiefly owing to more severe competition—especially during the last few years—for the supply of power by electric motors, and more recently that of producer gas with pressure or suction producers, gas engineers have been led to take the load-factor into consideration, and adjust their charges for the supply of gas used for power purposes so as to retain and extend this part of their business. Mr. S. Meunier, of Stockport, in his Inaugural Address to the Manchester District Institution of Gas Engineers, Feb. 25, showed that the plant required, and standing charges, to meet the needs of industrial customers vary considerably, with the result that the Stockport Corporation decided


Lighting Load
12·25 d per 1000 c.f. 15% deducted
less Spare Plant being required.
CAPITAL CHARGES
Average of Eight Large Provincial Gas
Companies Load Factor 57·5% Interest
Charges 7½d per 1000 c.f. of
Gas sold.
Lighting Load
6·25 d per 1,000 c.f.
Power Load
6d 1000 c.f. 10%
added for
Additional
Spare
Plant
LABOUR COSTS
Derby Gas Co's Load Factor 57½%
Labour Costs 4·5 per 1000 c.f.
Power Load
3·5d per 1000
c.f.
Pence per 1000 Cubic Feet
103½ days Lighting Load
210 days Present Average Load
232 days Power Load
Days. 0 36½ 73 109½ 146 182½ 219 255½ 292 328½ 365
0 10 20 30 40 50 60 70 80 90 100%
Load Factor = Gas sold × 100 / Max. output × days

twelve months ago to allow, upon gas used for manufacturing purposes only, discounts up to 10d. per 1000 cubic feet. The consumers' apparatus, whether gas-engines, gassing frames, or hatters' or confectioners' stoves, is tested for its maximum hourly consumption. This is multiplied by 50 hours for one week's work, and by 13 weeks for the quarter. The total amount of gas shown is the quantity required to be consumed during that period to earn 10d. per 1000 cubic feet discount; and upon the quantity actually used a *pro ratâ* discount is allowed varying by pennies That is, supposing the number of cubic feet shows the equivalent of 40 hours' maximum demand requirement per week, then 8d. per 1000 cubic feet is allowed; while if it only shows 5 hours' maximum requirement per week, 1d. per 1000 feet is allowed. In other words, for each 10 per cent. of maximum demand, discount of 1d. per 1000 cubic feet is allowed.

This is an ingenious method of charging, by which an approximation is made to the actual cost of giving the supply; and it will be interesting to learn the success or otherwise of the system after more extended trial. Mr. Meunier finds some consumers at Stockport actually obtain a discount of 10d. per 1000 cubic feet; while the average runs out at about 6d. This is a maximum demand system of charging for gas similar to the Brighton and other systems, limited to a special class of consumers.

The primary question under deliberation is what discount may be allowed upon gas used for power, in consideration of an even high load-factor throughout the year, without supplying it at a loss, and thereby calling upon the smaller consumers to make good the deficiency by charging those who can perhaps less afford

to pay it a higher price for their gas than otherwise would be the case? Gas-engines are at work as a rule all the year round; they consume gas in accordance with the power needed; and being installed of a size to meet consumers' power requirements will in a general way have a good all-round load-factor. Hence, in view of the competition already referred to, the important question is, Can we equitably reduce the price of gas for power consistently with profitable production, so as to retain this valuable class of customers, and make their retention a means towards lower prices all round?

In order to ascertain what reduction can consistently be given to users of gas for power, the author has plotted on squared paper the effect of load-factor upon cost of production and capital charges per 1000 feet of gas sold. The capital employed by eight large Provincial Gas Companies, as given in "Field's Analysis," is 9s. 6d. per 1000 feet of gas sold; and the total interest charges amount to 7½d. per 1000 feet, which is about 6¾ per cent. interest upon the capital. The load-factor of these companies, and represented by $\frac{\text{gas sold} \times 100}{\text{max. output} \times \text{days}}$, equals 57½ per cent. of maximum daily output throughout the year. The load-factor at Derby, calculated in a similar manner, is practically the same figure; and the author calculates that the average difference in costs for labour in manufacture and distribution between periods of maximum and minimum monthly output is about 2½d. per 1000 feet, which would be considerably greater but for the effect of the large quantity that is used for cooking, power, &c., which may be called day-gas.

In the diagram, the ordinates represent pence per 1000 cubic feet of gas, and the abscissæ the load factor. The curves give the sum required to pay capital charges and labour costs per 1000 cubic feet. The load-factor between lighting and power is assumed to be that as 30:80; and, upon this assumption, labour costs show a reduction of 2¾d. per 1000 feet, and interest on capital charges a difference of 6·15d., or a total of (say) 9d. per 1000 cubic feet, which appears upon these figures to be the highest discount power consumers ought to be allowed, as compared with those who use gas exclusively for lighting.

It will be found expedient to graduate this allowance in pence per 1000 feet according to quantity used, though, strictly speaking, the large consumer of gas for power purposes is not entitled to a very much greater difference than the smaller user, if the allowance is made simply because of the improved load-factor. Of course, it relatively costs less to supply one large consumer than fifty small ones; and it is desirable to so graduate the scale of charges that the large power user may be induced to continue to use town gas for power purposes.

The diagrammatic curve shows that the load-factor has an important bearing upon the sum required per 1000 cubic feet to pay interest on capital charges and labour costs. In the eight large Provincial Gas Companies which have been taken, the average selling price of the gas in 1902 was 2s. 2d.; and out of this sum 7½d. per 1000 feet is required to pay interest on capital. The proportion of maximum daily delivery to annual make was 1:2·10, or a load-factor of 57·5 per cent.; and in 1892 the proportion was 1:1·84, or 50½ per cent.—being an improvement of 7 per cent. in load-factor in ten years, with a reduction of over 1½ per 1000 cubic feet in charge for capital.

(*To be concluded.*)

INSIDE AND OUTSIDE.

By A. F. Browne, of Vauxhall.

[Extracted from an Article in the "Co-Partnership Journal" of the South Metropolitan Gas Company.]

Some years have passed since the writer was last invited to discourse upon the subject which can never long be absent from the heart and mind of a South Metropolitan employee—upon our "profit-sharing" as it then was—our "co-partnership" as it is to-day. The larger title and wider ideal is itself a result of that growth and development which year by year has testified to the reality and vitality of this great reform. There has, we know, been uninterrupted progress all along the line; in thrift, in the number of stockholders, in the amount of their holding, in mutual confidence and respect, in loyal and zealous service, and in the prosperity of the Company, which to-day is greater than ever. Such facts should convince even outside detractors that South Metropolitan co-partnership, is not, as they allege, based upon mere expediency, but upon feelings of goodwill, and upon what is a new departure, if not a new principle, in industrial relationship; and they may well fill us co-partners with contentment as we contemplate our present good fortune, and with a comfortable sense of security in looking forward, as we may, to a prosperous future for the great industry by which we live.

If, however, we look outside, our cheerful optimism sustains a shock as we realize the ugly contrast existing between our lot and that of so many of our fellow countrymen. A leading statesman recently said that in the United Kingdom thirteen millions of people—one-third of the population—live, or rather exist, on the verge of hunger. Surely, therefore, the great political question of the day, which unhappily no individual however eminent, and no party however powerful, seems able to answer, is this: How is this terrible state of things to be altered—how can the population as a whole be maintained in comparative comfort? The fact is, though the British people have accumulated an enormous capital, they have not yet mastered—they have barely tried to solve—the problem of the distribution of wealth. . . . We co-partners naturally ask why the system which has proved so conspicuous a success in our case cannot be generally adopted. The principle offers to each individual an incentive to put his heart into his work, because it provides him with a direct interest in the prosperity of the industry which the mere wage-earner does not possess. It would be absurd to dwell upon the value of willing service in these days of keen competition, whether domestic or foreign; but to those who may look upon co-partnership with doubt and hesitation, the writer would suggest that no better or more easily applied means has been proposed for the general promotion and encouragement of that efficiency which is said to be too often lacking in British enterprise.

Co-Partners! We may well be thankful to our Chairman and Directors for their initiation of this great movement, and to the shareholders who sanctioned it; and we do right to be proud of what the Company and we its employees have together made of it. Let us never forget that this great step in advance was purely voluntary. It was not taken at the bidding of an Act of Parliament; it was not conceded to the demand of a Trade Union. It was a new departure; it was home-made, or rather it has been home-grown. The motives and qualities which prompted and carried it through were insight, sympathy, courage, and persistence. These found responsive echo in our hearts and brains; and by them an industrial union has been built up and stands to-day secure, an object-lesson for all. For these things have not been done in a corner.

That co-partnership has come to stay few will venture or wish to deny; but imitation, which has been called the "sincerest form of flattery," lags, with a few notable exceptions, behind. Some day, however, the public will want to know the progressive steps in this industrial evolution, and the whole history of the progress of our Company along the path of this novel application of a great principle will be closely and carefully studied. Can we who have had the privilege, to say nothing of the material advantage, of being actors in this great movement doubt that it will be so? For it is a fact—a fact to be proud of—that the South Metropolitan Gas Company has made, and is still making, history, which, as Sir Oliver Lodge has recently said, is made by "influencing for better, or for worse, the destinies of the planet."

The world, though a little planet, is a big globe, yet who among us doubts that it might do worse than follow Great Britain's lead in questions of justice? Is it too much to suggest that, as regards the problem of the distribution of wealth, even Great Britain may with advantage give careful thought to what has been achieved by the South Metropolitan Gas Company?

Appended to this article there appears the following historical summary relating to the Company's co-partnership system:—

Yearly Rate and Total Bonus Paid to Employees.

	Rate per Cent.	Total.		Rate per Cent.	Total.
1887-9	Nest Egg.	£6,863	1898	7½	£17,612
1890	5	6,037	1899	8¼	20,664
1891	5	8,653	1900	9	23,734
1892	3	5,697	1901	3¾	10,221
1893	4	7,524	1902	7½	25,222
1894	6	11,276	1903	7½	27,813
1895	6	12,506	1904	8¼	33,212
1896	7½	16,217			
1897	7½	17,332			£250,583

From the figures recently gathered, it is learned that there are 5001 employee co-partners, and that they have a grand total of £230,013 in the Company. This is an average of £45 10s. each. Those who have had the good fortune to be in constant and regular employment with the Company during the whole of the time that bonuses have been distributed, have had the opportunity of having much more than £45 10s.; for a man receiving 30s. a week wages, if he had saved all his bonus from the start, letting the interest accumulate, would now have £106 8s. in the Company. It must not be forgotten that much money has been withdrawn on the deaths of men, or on their leaving the Company's service. A large sum has also been withdrawn for the purchase of houses.

Coolgardie Water Supply.—At the meeting of the Institution of Civil Engineers on March 28, a paper on the above subject was read by Mr. C. S. R. Palmer, M.Inst.C.E. The author, who succeeded the late Mr. C. Y. O'Connor, was responsible for half the work in connection with the great water scheme for the supply of the Coolgardie Goldfields, a full description of which was given in the "Journal" for the 31st of January last (p. 293). The original estimate, deducting the cost of the work not carried out, amounted to £2,435,000; and the actual outlay was £2,660,000. The excess is fully accounted for by the extra expenditure incurred in providing high-duty pumping machinery, the whole of which was furnished by Messrs. James Simpson and Co., of London; a clause being inserted in their contract giving them permission to have half of the manufacturing done by the Worthington Company.. A discussion on the paper was opened, and was adjourned till last Tuesday.

ANNUAL "INFORMAL" MEETING OF SCOTTISH GAS MANAGERS.

The Twenty-Second Annual Informal Meeting of Scottish Gas Managers was held in the Alexandra Hotel, Glasgow, last Wednesday—Mr. J. NAPIER MYERS, of Saltcoats, in the chair. There was a very good attendance.

Mr. W. B. M'LUSKY (Perth), the Convener of the meeting, said he had a letter from Mr. J. M'Gilchrist, of Dumbarton, regretting that he could not be with them that day, and expressing the hope that they would have a good meeting. As Mr. M'Gilchrist was a conspicuous absentee at meetings of Scottish Gas Managers, and especially as he was the gentleman who initiated and organized the Informal Meeting of Gas Managers for so many years, he thought they would be most anxious to send a message of sympathy to him, and their hope that he would very soon be back with them again.

The proposal was cordially agreed to.

PRESIDENT'S ADDRESS.

The PRESIDENT then read his Presidential Address, as follows.

Gentlemen,—I understand the object of meeting in this informal way every Spring is to afford us an opportunity of comparing notes, and of telling our friends of our struggles through the past winter. We were reminded last year that our meeting in this manner had attained its majority. It is with some diffidence that I step out to lead in our years of puberty. "As in a theatre the eyes of men, after a well-graced actor leaves the stage, are idly bent on him that enters next, thinking his prattle to be tedious," so I feel when I remember the many able men who have presided over this meeting. However, it is all informal, and I know I can depend upon your partiality to my failings, fancies, and foibles.

My notes are from my own experience in small operations, and may be of interest only to my brethren from the smaller townships—of 10,000 inhabitants or less. The burden of my story to-day will be "Small Economies in Small Gas-Works." I will try to recount to you some "next-to-nothing" things that make for success in management.

Michael Angelo was taunted by his friend for spending time on trifles; and he replied that "trifles make perfection, and perfection is no trifle." A gas manager resembles the artist, in that if he is to be successful he must give attention to trifles; and in efficiency he will find his best labour-saving appliances. I have nothing to say that will decide the battle between "inclines" and "horizontals," or determine which is the best way of projecting coal into a retort. For us from the country, there is nothing else to be thought of but the man with the shovel and the barrow.

I am inclined to think that our metropolitan men have followed too closely the original practice of charging and drawing in small units. The employment of elaborate machinery only increases the difficulties. When one has watched a blast-furnace man put in a "burden" of 5 or 6 tons into his cupola in less time and with less escape of gas than is expended in charging an ordinary gas-retort with 3 cwt., one is inclined to say: "That is the way, walk ye in it."

But to come to matters of more immediate concern to the men from the country, I wish to say a word on the selection of coal. When one receives from two to twenty offers of coal from two to twenty offerers, one is apt to be wearied by the task of selection, and to call for "the same again." I find I am assisted in the work of selecting by tabulating the offers according to the method herewith.

Coal Offers Tabulated.

Coalmaster.	Name of Coal.	Kind of Coal.	Price per Ton of Coal.	Weight of 1 Cubic Foot of Coal.	Amount of Gas per Ton.	Candle Power.	Ash in Coke.	Sulphur in Gas.	Sperm Value of Gas per Ton.	Relative Value at 0·15d. per Pound of Sperm Value.
			s. d.	Lbs.	Cub. Ft.		Per Ct.	Lbs.	Lbs.	
1	A	Wh. seam	12 0	76·50	11,965	27·84	10·20	13·69	1,142	171
2	B	Wh. seam	11 7	77·44	10,805	26·13	8·15	10·08	968	145
3	C	Wh. seam	11 1	75·62	11,470	23·63	7·30	14·34	929	139
4	D	Cannel	20 0	77·01	10,811	31·62	12·36	10·28	1,172	175

Railway station for Nos. 1 and 3, Caledonian; for Nos. 2 and 4, Glasgow and South-Western.

The price per pound of sperm will vary with each locality; but this may be chosen to suit one's circumstances. If the same coefficient is used for all the offers, we shall obtain figures setting out the relative values so far as the gas is concerned, provided the reports are all by the same authority. These prices when obtained are not to be taken as the final word in the selection, as there will be drawbacks to be made on account of (1) poor coke. (2) excess of sulphur, or (3) dubiety about the reporter; and this is where expert knowledge will come in. Still, I think the "relative value" column in the table is of some value.

Though the analyses of coal with which we are familiar may not have the authority of the Sermon on the Mount, they are of more value to the practical man than the "fairy tales of M. de Rougemont." The analysis is the high level of results to which we should seek to attain, not forgetting that these high-level results are obtained from the best sample the colliery can produce, carbonized under ideal conditions. Well, it is better that we should know what these are than to have them whittled down to the poor level of our practical results with inadequate plant.

The coefficient that we use for ascertaining the money value of the coal delivered at Saltcoats just now is 0·15d. per lb. of sperm; but this will vary with the market and with the locality. A different coefficient may be used for cannel, in order to compare cannel with cannel.

In the work of carbonizing, it is not always profitable to run for big yields, either per ton of coal or per foot of retort. We should endeavour to get the full photometrical value of the best material that lies to our hand.

I had an opportunity lately of making a trial of carbonizing at various degrees of heat, and took some notes of the results, which I now lay before you. We were using a whole-seam coal only, containing about 20 per cent. of cannel. The cannel was kept apart and used more or less as the quality of gas required. The demand for coke cleared our yard every day; so one easily knew how much was used for fuel, for steam, and for breeze.

Results Obtained by Carbonizing at Various Temperatures.

Amount of Coal Tested.	Amount of Gas Produced per Ton of Coal.		Profit per 100 Cubic Feet.	Profit per 10,000 Cubic Feet.
Tons. Cwt.	Cubic Feet.		d.	s. d.
18 13	9,533	With four retorts	1·55	12 11
39 0	9,892	and	1·58	13 2
20 0	10,221	four-hour charges.	1·60	13 4
28 0	10,771	With eight retorts	1·62	13 6
60 0	10,900	and	1·64	13 8
60 0	10,986	six-hour charges.	1·65	13 9

The first three observations were with four retorts, working with charges of four hours' duration.

The mode by which I arrive at the balance of profit per 100 cubic feet is to debit the coal at 15s., and credit the gas and the coke produced at 3d. and 4d. per unit, and divide the balance by the number of units of gas produced. The results are shown in the column, "Profit per 100 cubic feet."

Take the last one as probably being the most attractive—working to yield 10,986 cubic feet per ton.

		Produced for Sale.	
59½ tons at 15s. . .	£44 12 6	6537 (hundreds) gas at 3d.	£81 14 3
Balance . .	45 1 5	479 cwt. coke at 4d. . .	7 19 8
	£89 13 11		£89 13 11

£45 1s. 5d. ÷ 6537 = 1·65d. = profit per cent. of gas made.

The prices in this calculation were taken as nearly representing, at the moment, the value of the materials on our premises; but it does not matter whether they are above or below the intrinsic value of the goods, as the same prices were the factors used in each test to ascertain the balance of profit.

This list of tests is very incomplete; and other factors should be reckoned with before a true balance can be ascertained. As presented, a gain of about 10d. per ton is made by increasing the yield nearly 1500 cubic feet above what I would call the normal level. Each one must judge for himself whether this is worth the increased wear and tear of brickwork, the lessening of the duty per mouthpiece, the need of extra enrichment, and the excess in deposition of carbon in the retorts. I sometimes "hae ma doots aboot it;" but directors love to have it so.

Those of you who use lime-luting for your retort-lids, what do you do with the old material? Likely sweep it into the ashpit. But it is worth saving. Twelve retorts require 1 cwt. per day of the finest of lime. It is not very promising looking stuff when swept up from the retort-house floor; but it is only mechanically dirtied and is not chemically unclean. I had two purifier-boxes wholly filled with this once-used luting, and they served as long as any others. I recommend you to save the lime from the retort-lids.

Another small matter I would commend to your notice is the use of "Watkin's patent heat recorders," to familiarize yourself with the degrees of heat in your settings, especially in the return-flue, under the retort, which should be about 2000° Fahr.

Some years ago, there used to be a saying current among gas managers that "thorough condensation was half purification." We do not hear so much of this story nowadays.

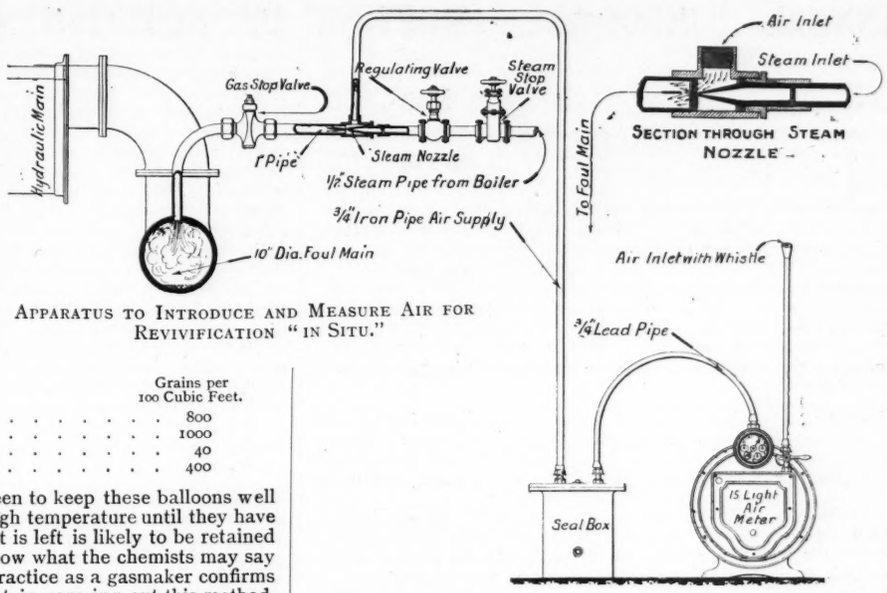
In our work of making gas from coal—the whole operation being carried on in closed vessels—it is needful to exercise the imagination as to what is going on. To assist my imagination

I sometimes use a stethoscope to listen at the retort-lids, the washer, exhauster, scrubber, and meter, to thus become familiar with the sounds in these things. I recommend you to borrow an old one from your doctor, and become familiar with the right working sounds of the "in'ards" of your plant.

In trying to follow, in imagination, the gas in its travel from the retort to the holder, I think of each molecule as a balloon of hydrogen enveloped in a film of carbon, and having for sand bags the makeweights of impurities which, according to Mr. O'Connor, are—

	Grains per 100 Cubic Feet.
Sulphuretted hydrogen (H_2S)	800
Carbonic acid (CO_2)	1000
Bisulphide of carbon (CS_2)	40
Ammonia (NH_3)	400

My anxiety for a long time has been to keep these balloons well inflated by maintaining a fairly high temperature until they have shed their makeweights, and what is left is likely to be retained permanently as gas. I do not know what the chemists may say to this fancy of mine; but my practice as a gasmaker confirms the wisdom of the plan. To assist in carrying out this method, our practice is to blow live steam into the crude gas coming from the hydraulic main, by the use of the arrangement set out in the sketch. The amount of steam used is equivalent to about 5 gallons of water per ton of coal. This quantity at our boiler pressure will aspirate about 2 per cent. of air through the appliance, if the way is clear. We do not often clear the way to the full extent, but throttle it by the tap on the inlet of the meter, and thus limit the amount aspirated to about 1 per cent. This, I think, is useful to assist the work of purification, whether by lime or ferric oxide.



APPARATUS TO INTRODUCE AND MEASURE AIR FOR REVIVIFICATION "IN SITU."

During last winter I made many tests extending over four months, with and without steam in the foul main, in order to find out the effect upon the amount of liquor produced and the quantity of gas made per ton. Here they are, designated as wet or dry, being respectively with or without steam:—

Condensation Without Steam and With the Aid of Steam.

	Amount of Coal Used.		Liquid Products per Ton.	Amount of Gas Made per Ton.	Durability of 5-Inch Flame.	
1904.	Tons.	Cwt.	Gallons.	Cubic Feet.	Min.	Sec.
Oct. 25	8	14	64·0	10,160	43	45
Nov. 5	9	0	55·1	10,600	43	45
,, 10	9	9	49·0	10,656	42	30
,, 18	10	10	57·8	10,028	45	35
Dec. 14	11	11	60·2	10,232	44	40
1905.						
Jan. 17	11	5	59·1	10,355	45	50
	60	9	345·2	62,031	266	5
Average	..		57·5	10,340	44	20
1904.						
Oct. 29	9	0	69·5	10,477	41	15
Nov. 29	10	10	64·2	9,762	48	40
Dec. 22	11	8	60·9	10,684	44	25
,, 28	11	8	60·9	10,500	46	45
1905.						
Jan. 11	11	7	57·1	10,000	46	0
,, 20	11	4	64·1	10,080	46	50
	65	17	376·7	61,503	273	55
Average	..		62·8	10,250	45	40

Grouping these under two heads—the dry and the wet process—the products per ton of coal used are—

	Tar and Ammoniacal Liquor. Gallons.	Amount of Gas. Cubic Feet.	Durability of 1 Cubic Foot by 5-Inch Jet Flame. Min. Sec.
Dry process	57·5	10,340	44 20
Wet process	62·8	10,250	45 40

All of you who have attempted to make comparative experiments will know how difficult it is to get identical conditions on two days. Those made on Jan. 17 and 20 are comparable; and the results fairly well agree with the average above stated.

Let your condensing be ample in offering friction to the gas, and with sufficient exposure to deliver gas to the scrubber at about 60° Fahr.

On the much-debated question of purification, I would support the pronouncement made here by my predecessor last year; and to my brethren from the smaller towns I would say, "If you can get rid of your waste lime, don't bother with oxide." In the working of lime purifiers we can do much to improve the duty done by them, and effect economies in material and labour by attention to some "next-to-nothing" things.

I will set out below the work done by four purifier-boxes, 9 feet by 9 feet by 4 ft. 6 in., at Saltcoats during the last ten years of their life there.

Statement of the Work Done by Four Lime Purifiers at the Saltcoats Gas-Works for Ten Years.

Year.	Amount of Gas Made per Annum.	Cost for Lime per 1000 Cubic Feet of Gas.	Number of Operations of Changing Boxes.	Average Amount of Gas Cleaned between the Times of Changing Boxes.	Lime Used.	Remarks.
	Cubic Feet.	d.		Cubic Feet.		
1891	11,175,300	0·80	47	237,772	N. Ayrshire	Scrubber erected.
1892	11,894,600	0·63	41	290,112	,,	
1893	12,642,500	0·93	38	332,697	,,	New grids in purifier.
1894	12,122,500	0·58	29	421,250	,,	
1895	12,756,300	0·70	32	398,600	,,	
1896	13,539,700	0·55	33	410,300	,,	Commenced to lime-wash purifiers occasionally.
1897	15,331,700	0.54	32	479,000	,,	
1898	16,710,000	0·53	35	477,420	S. Ayrshire	
1899	18,557,900	0·64	38	490,500	,,	Lime-washed boxes every time.
1900	20,763,500	0·62	36	572,400	,,	

During these years we were using Scotch lime only and carbonizing mostly Ayrshire coal, with a small proportion of Lanarkshire cannel.

The improvements were effected by increased cleanliness, ultimately whitewashing with lime the interior of the boxes and the rails every time of opening, and the inside of the covers every summer.

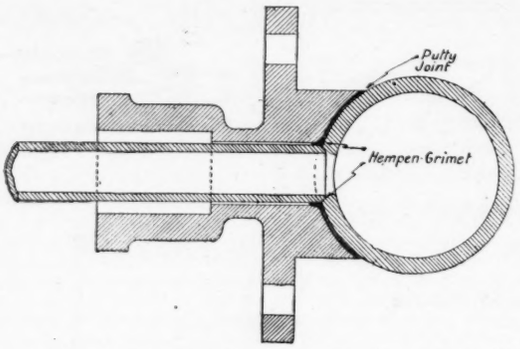
While on the subject of purification, I would recommend that managers of even the smallest works should expose test papers in suitable glasses to a constant stream of about 10 cubic feet per diem. Attach these papers day by day to "The Gas World Year Book," and you will give a permanent value to a valuable almanac.

My final word on the subject is, whitewash your purifiers.

On the question of the distribution of gas, I said a good deal last year in another place. I will not repeat myself now, but only say that I favour the use of "dry-sand" pipes cast vertically for mains, and steam quality wrought-iron pipes for services. In connecting a service-pipe from a house and finishing at the main, I prefer to make the junction by means of a saddle-joint (p. 102), if the main is not more than 6 inches diameter. I get "saddles" with the gas-way large enough for the tube to pass through and to lodge in the main, in the hole drilled for it. By means of a "grummett" and a little red lead, a gas-tight joint is made; and if the socket is filled with yarn and cement, you will have a junction with your main that is a source of strength, instead of being, as described by Mr. Newbigging, the chief source of leakage.

Meters offer themselves next in order for observation; but I will not touch the question of unions at this time, as that will be looked after by elsewhere.

There is another question which I think it is time one or other of the organized bodies of gas engineers of this country should take up—I mean the range of error permitted in gas-meters. Some of you know, though it may be news to others, that the "Act for Regulating Measures Used in Sales of Gas" was passed on



SADDLE JOINT FOR 1-INCH TUBE IN 4-INCH CAST-IRON MAIN.

the 13th of October 1860, and became compulsory (section 17) "after the expiration of ten years." This Act says: "Meters not to be stamped if more than 2 per cent. incorrect in favour of the seller or 3 per cent. in favour of the consumer, and to be stamped if erroneous to no greater extent."

Gentlemen, half-a-century has passed since this Act was framed. In those days the wet meter was the favourite instrument, and the dry meter was not considered to be a meter at all, but only a mechanical counter, like a cyclometer, and was a concession to bad gas-fitting. Now the circumstances are quite altered. Very few wet meters are made for selling gas with; their possible greater accuracy not compensating for the drawbacks concomitant with their use. Municipalization of gasmaking sealed the doom of the wet meter as a mode of measurement of gas to the public.

The popular demand for dry meters has produced a very perfect instrument; and I do not hesitate to tell consumers that nothing they use is so accurately measured to them as their gas. My quarrel is with the margin of 5 per cent. that is allowed between two meters both of which may be stamped correct. There was reason for this range when we had to depend upon a water-line which could only be maintained, without variableness, by frequent watering. But we all buy dry meters now; and I think a dry meter is capable of finer adjustment than to require a latitude of variation of 5 per cent. So I think the time has come to amend clause 17 of the Sales of Gas Act.

In improving the dry meter, I hope it will not be necessary to elaborate it or enlarge it either in size or price. I am sorry there has arisen any need for that elaboration called the prepayment meter; it is an improvement that ought to be damned. I would like to see the gas-meter become as simple as a sailor's patent log or a cyclist's meter. I have hopes that the rotary meter may become fit for domestic uses, as that would be an improvement to be blessed.

I thank you for the patience with which you have listened to me. I thank you for the honour you conferred upon me in asking me to preside over your meeting to-day. I thank my Assistant, Mr. Barbour, for preparing these tables for me. I have said a good deal, and spread myself abroad pretty freely; but I hope I have not said all there is to be said on these questions. Our operations and proceedings are wholly informal; and in this spirit I have had my address printed and some copies sent out. Among others, I sent one to my friend, Mr. Carmichael. I thought it well to do this in order to give him the opportunity, perhaps, of opening the ball on this occasion, by offering a few remarks.

Discussion.

Mr. M'LUSKY thought that, before proceeding to discuss the very excellent address which the President had delivered, they would be anxious to accord him a hearty vote of thanks; and he was sure that the subject-matter he had provided would give them an opportunity of discussing it to the full. The President had covered a lot of ground, though he had but touched the fringe of a great many of the topics in his address. He was sure it would be well received, and that they would signify their approval by discussing it fully.

Mr. J. W. CARMICHAEL (Barrhead) thanked the President for his characteristic and able address. The burden of his story—small economies in small gas-works—was a very suitable one. There was no doubt, if there were to be successful management, they must attend to the small things, especially where profit and loss was concerned. There were some points he agreed with the President upon; and there were some things he disagreed with him upon. He would take first of all the things he agreed with. First of all, he was at one with the President that coal offers should be tabulated. Most of them advertised, and received offers from Tom, Dick, and Harry. They might have, perhaps, as many as twenty offers of coal; and it was impossible for any gas manager to deal with the coal offered, unless he had, black upon white, their relative values. He agreed that big yields did not always give a profit. There were other considerations, and the profit they received from a few extra hundred cubic feet might be swallowed up entirely by the enrichment required to bring the gas up to the standard. There could be no difference of opinion, he thought, as to the value of the old lime from the doors and mouthpieces. He did not sweep it up particularly; but he did gather some of it up, and put it into the lime-bing again, and used it—for the doors, not the purifiers. There was no harm, he thought, in putting their ear to several parts of the apparatus, to see if all was going well. Very often they could tell, by the noise in a machine, whether the gas was flowing the right way or not; but to use a stethoscopic instrument for the purpose was a thing that he would not think of. He should fancy a better idea would be to have a considerable number of pressure-gauges, which would tell at once how things were going. The table in regard to condensation with and without steam was, he thought, a very instructive one; but he did not think that steam had much to do with the fact that durability had increased, because he found that on Dec. 22 last year the quantity of gas made per ton of coal was 10,684 cubic feet, and it seemed to him, somehow or other, that it was more, perhaps, the heats that had to do with this. Then, with regard to the quantity of ammoniacal liquor, he did not think anything could be claimed for this, because it seemed to him it was pure water, and the ammoniacal liquor was reduced in strength to this extent. One other thing he thought he agreed with, and that was the regulating measures for the sale of gas. He considered the President's remarks were very timely. There was no doubt at all that the dry meter was the popular one. It had been brought to great perfection; and he did not see why there should be at the present day such a margin of difference as 5 per cent. between one meter and another. Now he was going to speak on one or two of the things he disagreed with the President upon. He disagreed with him entirely upon the much debated question of lime purification. He could not go in with him there, and advise managers to give up oxide of iron for purification. He could get his waste lime away, and, indeed, could command a price for it. But for three years he had been using oxide; and he might say that he had saved worry as a manager, and had saved a great deal of labour. He would not like to go back again to lime. He had not had a purifier changed since Feb. 12; and it might be some time yet before he changed one. He disagreed also with the statement that by cleanliness and the whitewashing of purifiers there was a great increase in the quantity of gas passed through the boxes. He did not say that there was any objection to cleanliness; but he had his "doots" about whitewashing accounting for all this extra quantity. He noticed that the President had changed his lime from North Ayrshire to South Ayrshire; and there was not the least doubt that the South Ayrshire lime was of a better quality than that from the North. Perhaps it was the coal that accounted for it, or the lime, and not altogether the whitewashing. Then, at the very end of the address, there was the word "damned." Well, this was a word he did not very often use; and he looked up the dictionary to see what it meant. The dictionary said it was "to condemn as bad." Would anyone say that a prepayment meter was a bad meter? It was a meter which had brought cheer and light into the houses of many poor persons, and it had brought untold life to many a gas company and corporation. He was afraid the President would get very few gas managers to condemn an instrument which had been of incalculable benefit to the gas industry, and which had been a boon and a blessing to many a gas company and corporation.

Mr. A. YUILL (Dundee) said that in the address, as had been pointed out by the President of the North British Association, there were some things they could approve of, others they could not. The President had spoken about small economies in small gas-works. This was a point he did not think they should allow to pass from the meeting, because economies were considered advantageous in large as well as in small works. In fact, the sooner they realized that fortunes were made in savings, not from earnings, the sooner would they bring their undertakings to a more substantial basis than they were on at present. It was from these small things that they obtained the benefits which were to be found at the end of their financial year. When he spoke of small things, he meant decimals of a penny per 1000 cubic feet. If any of them realized that some neighbour was carbonizing at 0·1d. per 1000 cubic feet less than he was able to do, then it would be his position to try to emulate his neighbour, and produce gas, if possible, at less than he did. The President gave them food for reflection and consideration when he spoke of the analysis of coal. This was a subject which troubled many of them. What they had to deal with more particularly was the practical results, in their own works, from the coal most suitable for use. In his own case, in considering one coal with another, he tried to determine, and took into consideration, all the factors he could possibly lay his hands upon, to arrive at the true value of the coal. First of all, he took the volume of gas per ton, and next the illuminating power; then, by taking the volume and the illuminating power, he was able to determine the sperm value, which gave him just as good a basis as the one in the table. In the table he was at a loss to make out which of the four results given was the best, because if he looked at the one designated A, he got 171 as the relative value at 0·15d. per pound of sperm value; and if he took the one designated D, he got 175. This was misleading; but if they created another table for themselves, and termed it the cost per pound of sperm, then they arrived at its monetary value, and could make a comparison. In the same table, if they took the coal per ton, it worked out at 0·26d. per pound of sperm; and if they took D, it worked out at 0·205d. per pound of sperm. They thus obtained a greater difference than they got in the one given them there. They could therefore

calculate the difference. Independent of these considerations, there were other factors to be taken into account. Certain coals, as they all knew, yielded a large amount of tar. In some—he was speaking of cannel—they obtained from 18 to 22 gallons of tar; while in others, as low as 5 gallons. He was speaking of coking coal, what they might term dry coal. The difference between (say) 6 gallons and 18 gallons, at 1d. per gallon, which was at present a fair price, came to 1s. per ton of coal. Now, 1s. per ton of coal was not to be trifled with. Then they got ammoniacal liquor of less value, which also made a difference. Again, they might have a coal very high in sulphur, which naturally affected the cost of purification considerably. They might have another coal very high in carbonic acid, which also affected the purification; or they might have a coal very low in carbonic acid. Some English coals differed in their characteristics from some of the Scotch coals. Those who knew anything about coal strata, or the working of coal at present in Scotland, were well aware that they were approaching very closely, in the coal that was now being carbonized in gas-works, to that which was being used in England. At one time it was cannel they used in Scotland; but now they could take any class of coal they liked. It stood to reason that, if they employed a coal which gave a very high percentage of carbonic acid, they must, of necessity, use lime to eliminate or take up the carbonic acid; or, if it went into the gas, they must provide for the loss in illuminating power by the use of cannel or other enriching material. If he were dealing with a coal containing (say) 1 per cent. of carbonic acid, he might dispense with lime altogether and use oxide of iron, and possibly revivify *in situ*, to lessen expenditure. In dealing with the value of coal, all these things required consideration. The President next considered the question of carbonizing at different temperatures. They all recognized that if they were working at high heat they obtained a larger volume of gas, but less coke. The illuminating power suffered; they had less tar, and in some cases less ammonia; and sometimes they were troubled with choked pipes. The wear and tear of the retorts was increased, and more coke was required for heating up. In certain works—there was one in his mind at the present moment (he was taking his figures from published statistics), and he must say that he envied it—in which they were able only to produce from 7000 to 8000 cubic feet per ton, because they were able thereby to have a much larger yield of coke for sale, and a much larger yield of tar and liquor. What they had all to consider was what was the cost (say) per 1000 cubic feet, after deduction of residuals. The President had mentioned the little heat recorders of Watkins. He had used them, to satisfy his curiosity as to the temperature of the flues. They were very good for this; but he did not think anyone would use them every day. As to what the President said regarding the gas being enveloped in what he termed balloons, there was one thing they required always to keep before them—that if they were using oxide solely for purification, if they got bisulphide of carbon in the gas they had nothing to eliminate it. But they had a substance always at their hand in lime—sulphide of calcium—which acted as a solvent of the bisulphide, and eliminated it altogether from the gas. When a saddle was properly fixed it formed one of the best joints they could possibly have; but he would not make it exactly as the President did. He would not like it to go forth from the meeting that they condemned the use of automatic meters. He could imagine some managers experiencing a difficulty with their directors or committees in advocating the use of automatic meters—they had all experienced it more or less—and he would raise his voice in praise of the system, as far as he could, from a consciousness of the benefit it had been to many a poor family. He did not see why companies or corporations had any reason to condemn automatic meters, because, even supposing they cost a little more than an ordinary meter, they generally charged a little more for the gas consumed through them, which compensated them. He agreed with the President when he said he saw no reason why the range of error in meters should not be altered. He thought it should be fixed at 2 per cent. fast and 2 per cent. slow.

Mr. J. Ballantyne (Hamilton) congratulated the President on the way he had introduced the matter to them. He had given them a table of coal analysis, taken from those coal analyses which were so useful, and which was very much on the same lines as that with which he had been acquainted all his days. But the peculiar thing about these coal analyses, which he had never been able to understand, was this, that they got chemists giving analyses in almost every other subject, and coming very close to each other indeed. He had a case in his mind in which a sample of a certain material was submitted to chemists in Glasgow, London, and New York; and in each instance the analysis came to within a thousandth part of each other. Now, when they came to coal analysis, they found that there was a huge difference. If they pitted the analysis of one tested against that of another, they would perhaps find that, instead of a difference of a thousandth part, there was, perhaps, 1000 cubic feet. Why should there be such a huge difference between the tests of chemists? There was something wrong somewhere. The analyses they obtained were very little of a guide to those who were most in need of them. He hardly thought the limewashing of purifiers would cause a difference of 100 per cent. in the results. There seemed to be something else in it. Had no alteration been made in the scrubbing power? This, perhaps, had had as much to do with it as anything else. If there were to be limewashing, he should say that the inside of the covers would be the place to wash, because any impurities which might be thrown off would adhere to the cover. But he thought that if the sides of the purifiers were thoroughly brushed, and the floor swept, that was all that was required. He saw no objection to having the degree of error in meters altered. But would any great benefit be derived from it? Any change would tell both ways. That was to say, if a meter were more than 2 per cent. fast, they must allow for it to the consumer, by making a reduction of his account; but if they reduced the percentage of error to 1 per cent. slow, they could not charge the consumer more than this, even if his meter was registering 2 per cent. or more slow. So that it would tell, in this way, in favour of the consumer. At the same time, he did not see why they should not have the range of error reduced to perhaps 1 per cent. He must take exception to the President's statement that the prepayment meter should be damned. This was a strong remark to make; and he thought the President had made it inadvertently. He did not think he meant it. The President must have a different class of consumers to supply than most of them had. They knew he had a select class all the summer, few of whom probably required a prepayment meter. Corporations and companies had in many instances spent thousands of pounds upon these meters; and if it went out from the meeting that the meter was wrong, they would be putting themselves into a very difficult position indeed when they met with their directors or committees, because they would expect some explanation, if they had recommended the adoption of the meter, of why they had turned round and said it was a bad meter. He knew that at Hamilton many people would not burn gas at all unless they obtained it through a prepayment meter. Unlike what was to be found in Saltcoats, in Hamilton there was a very large class of people who had their pay on Friday or Saturday, and, as they knew, by Monday there was nothing left. This class would not consume gas through an ordinary meter under any circumstances, and would only take it when supplied through a prepayment meter. On this account the prepayment meter had come to stay; and he saw nothing wrong in it. They only charged as much extra for the gas as covered the cost of collecting and interest and tear and wear on the meter, and such like; and, so far as he knew, the consumers did not complain so long as they were charged in a reasonable way.

Mr. W. Mackie (Port Glasgow) asked why there should be a saving in the whitewashing of purifiers. He had had a purifier out, and had also had a gasholder telescoped, but he found no deterioration of the ironwork inside; he found the paint so that he could take it right off with his hand—it was so soft.

Mr. D. Vass (Airdrie), referring to the carbonization of coal in larger quantities than hitherto, said that was a line in which there was a great field for bigger works. It would, he thought, repay them much better than either inclines or horizontals. He did not see any great difficulty in carbonizing coal as it was done in coke-ovens. He should say that the coal analyses referred to by Mr. Ballantyne were not analyses at all—they were merely a means of tabulating certain results. The coal was not divided up into all its parts, and all the parts accounted for. What was wanted was a standard form of testing coal; and he thought the subject was one which might be taken up with profit by the North British Association. What they wanted in gas-works was the results of chemical combinations of coal—not bare analyses. He would have preferred a much simpler unit than the 0·15d. which the President had adopted. He was in the position of finding it more profitable to work for a smaller yield of gas from a special class of coal. They were content if they obtained something like 8000 cubic feet per ton. This paid better than trying to drive it up to 9000 or 10,000 cubic feet, from certain classes of coal. To get a higher yield they required to use another description of coal altogether, which would yield a smaller return of residuals, and no better return in regard to illuminating power. By working longer charges, the President had brought out certain figures; but he thought there would also be extra labour, for which he had not allowed. Of course, this would not absorb the whole 10d. per ton, but it would absorb a little, because if they worked with longer charges they would require more retorts, and the men would want to be paid in proportion to the number of furnaces to be cleaned. In making joints, he found it met the case to have a pin driven into the hole, to keep the saddle in position, and not to make the hole so large as the President did, because it tended to weaken the pipe when they came to anything below a 4-inch main. There might be a limit put on to the range of error in new meters; but for meters already in use it was a very difficult question. They all recognized that the prepayment meter was, and had been, a troublesome meter. If they were paid an extra price for the gas, they were bound to keep the meters in the best order they could. Nearly 40 per cent. of his meters were prepayment ones, which showed that he could not condemn this meter. In purification, he had practically the same apparatus as the President showed; and he introduced air just at the inlet of the condensers. He used oxide alone; and he had not seen the bottom of the purifiers since October last. It was quite possible to work oxide in such a manner that they could put it in new and let it stay in until it had the utmost limit of sulphur in it, without handling it. This was simply done by the manner of their putting in the air, and spreading the fouling and revivifying round the whole series regularly. He changed the valves every second day at this time of the year. In winter, they

often found it necessary to change the valves once a day. This occupied about a minute, with two men. It was done almost as quickly as the taking of the daily test. He never had more than the first purifier showing foul.

Mr. T. WILSON (Coatbridge) was sure they were all much indebted to the President for his address. He had given them something which was novel and some things which were not. A stethoscope was certainly novel; and he hoped it would be of more use to the gas profession than, in his experience, it had been in the medical profession. He thought a few pressure-gauges would guide them as well as a stethoscope. Coal purchase was to them a very important matter. The President had certainly been to considerable trouble in getting these tables up; but he (Mr. Wilson) might tell them what they did at Coatbridge. They had analyses submitted to them, and they looked to see the percentage of ash in the coke. They looked at nothing else, because he found that, in practical working, they could not get within 10 or 15 per cent. of the results stated in the analyses. There was a great deal to be considered in regard to the value of the coal itself. They had certainly the quantity of gas to look at. Mr. Yuill said he envied people who made 8000 cubic feet per ton, but got more for their residuals. He was once in the happy position of getting 2s. 11d. more for residuals than he paid for coal. He used small stuff, and enriched with benzol, which he found to be very suitable. Meters had been spoken of. The meters he had were correct; they were not 2 per cent. fast, nor 3 per cent. slow. It would be too bad to enact another burden upon the poor meter maker—that was, to give an instrument perfectly correct. Had they not enough burdens already? If meters were not correct, they upheld them for five years; and he thought they did so very well. The President had certainly not studied the prepayment meter. He might tell him they had been a boon to every gas company and corporation who had adopted them. In Coatbridge, he thought he was safe in saying, they had nearly doubled their consumption of gas owing to them. They had certainly doubled it, due to these and to the use of stoves. They had 2500 of them out; and they were very profitable. Of course, they charged more for the gas consumed through prepayment meters.

Mr. W. EWING (Greenock) congratulated the President on his excellent address. Economies could be effected quite as much in large as in small gas-works. The smaller Scotch works often showed them the way to go, because in them they had superior results as compared with the larger works. It all resolved itself into the watching of little details. The President could speak from practical results, because he was one of the gas managers in Scotland who showed an excellent return per ton of coal carbonized. The yield of gas per ton was a very important factor; and the President obtained one of the best. He fell into line with the President as regards purification. He was not very sure that oxide was the real success that was claimed for it. Mr. William Young, many years ago, read a paper on oxide purification and its destructive effect upon the illuminating power of gas. This paper could be read to-day, and they would find that Mr. Young had been many years ahead of his time. The President had done right in bringing forward the question of the percentage of error in meters. It was a very important matter that they should have an instrument which, as far as possible, should be absolutely correct. Gas managers strove to be accurate; they did not wish to rob the consumers, and they did not want to be robbed. He had gone to some little trouble in connection with that. Of 173 meters fresh from the makers, he found that 21 per cent. were fast, 36 per cent. slow, and 43 per cent. correct. They varied from 2½ per cent. slow to 1½ per cent. fast. The loss, on the whole, was very considerable; and yet the meters were stamped as being correct. This, to a considerable extent, explained the leakage or unaccounted-for gas; and the time had come when they should ask the meter makers, or the legislators, to allow the error to be only 1 per cent. on either side.

Mr. T. WILSON said he had neglected to speak about purification. The President should be complimented on the care taken in white-washing his purifier-boxes and the like. He never attempted to do this, because he found that the catch-boxes behind caught any impurity which might pass along. But Mr. Vass said he never saw the bottom of a purifier. In Coatbridge, they cleaned from 60 to 80 million cubic feet of gas with one box; but he could not do this if he started with new oxide, because he found it was inactive at first. He had to take it out and put it in two or three times before it was useful. He found oxide of iron purification much less costly than lime.

Mr. VASS said it was only figuratively that he was speaking. He could not say that he put in oxide and never took it out.

Mr. J. KINCAID (Kirkcaldy) said that the President was never idle; he was always experimenting with his plant, in one way or another, and with beneficial results. He had been rather interested in the remarks about the analysis of coal, compared with practical working. He put in a testing plant this spring, and tested the coal he had been using during the winter. On doing so—not with a very high heat, because a cast-iron retort was used in the testing plant—he found an average yield of 10,490 cubic feet of 23½-candle gas per ton; and in actual working (with very high heats, certainly above the average) they only obtained 9970 feet of 22-candle gas—showing that they had 520 cubic feet of gas less per ton of coal, and 1½-candle power less. He had no doubt the chemists, working for an employer, would obtain much better results than he did; and they could easily explain away the difference. Now-a-days, when so much splint coal was being used, they would find that in nearly all coal there was a considerable quantity of foreign material. In the days of cannel, they had pure coal through and through; but now a great deal of splint was used, which was not so pure. He had not gone to the trouble to test the splint coal yet; but in Kirkcaldy they used about one-fifth of Fife shale, which was considered the best enricher in Scotland. It lay at their door, and so they got it cheaply. He tested the coal at various parts of the seam, and found some wonderful differences in the results—varying from 11,200 cubic feet of 34½-candle gas to 9800 feet of 22-candle gas. They therefore required to be very careful as to the coal they secured. The workings were being continually altered, and they could not expect to always get the same coal. He supposed he would be considered behind the time; but he could not see his way to change yet from lime to oxide. Purification cost him 0·6d. just now for material and labour. This was not much, with gas at 2s. 6d. per 1000 cubic feet. He was certain he would lose far more than this ⅓d. if he started to use oxide. He would have to buy a better class of coal, and enrich. He had experience with oxide in Falkirk; and he stopped using it, with the result that the illuminating power of the gas jumped up 2½ candles. He agreed with other speakers that prepayment meters had been a boon to companies, corporations, and consumers. He thought he might have heard that day of complaints about ordinary meters being left in the hands of companies and corporations, because a few years ago they refused to give prepayment meters to people who had ordinary ones. But now they had all changed, and were glad to let people have a prepayment meter, with the result that ordinary ones were accumulating with them.

Mr. L. HISLOP (Uddingston), dealing with the presence of carbonic acid in coal, said that, taking the coal they used in the West of Scotland, he thought that, with efficient scrubbing machinery, and working with strong liquor, the carbonic acid could be easily reduced to about 1 per cent.—and 1 per cent. had very little effect upon the illuminating power. Mr. Ballantyne spoke about the analysis of coal. He thought the quality of the gas was tested by the flat-flame burner by the firm he mentioned, and that with other analysts the gas was tested with an argand burner; and it was a well-known fact that in this there would be a difference of about 4 candles. There was not an analyst of coal but would take the best he could out of it. Analyses, as ordinarily printed were made as nearly as possible under gas-works conditions, with the exception, of course, that they had no hydraulic main; and working with a dry main meant a considerable increase in the quantity of the gas, and its quality. He found it difficult to get the class of coal Mr. Vass referred to. Every day managers in the West of Scotland bought coal from Fife and the East; and managers in the East took coal from the West, which was only taking money out of the pockets of the consumers and putting it into those of railway shareholders. As to the sperm value, if they had some coal giving about 5 cwt. more coke than other coal, 10 lbs. of sulphate more per ton, also 12 to 15 gallons more tar, and taking the value of these at present at from 3s. 6d. to 4s., they would see that there were other matters of more importance than a large yield of gas per ton of coal.

Mr. D. MACFIE (Edinburgh) desired to make a few remarks upon meters, which appeared to be a question of general interest. They would see that the gas-meter came in as a medium between the buyer and seller. Gas was measured, not by an infallible instrument, but by an instrument which, it might be held, said that those who sold must be content to accept payment of the consumers' accounts if the meter was 3 per cent. against the sellers, and that the consumers must be content to pay their accounts if they were not more than 2 per cent. against them. This seemed a perfectly reasonable way of settling disputes. The arrangement was that within these limits the meter was correct; and if any of them were to argue that a meter under new conditions was not correct after a period of use, what a world of trouble they would bring about their own ears. It seemed to him that the last state would be worse than the first. He thought it was unfair to suggest that the difference was 5 per cent. They must take it that, if one half of the meters in a town were 2 per cent. wrong, and the other half were 3 per cent. wrong, that only made 1 per cent. on the difference. If, however, they, or anyone else, cared to approach the Standards Department with any recommendation, this was the very time to do it, because he understood that the Department were prepared to receive suggestions at the present time with regard to the standard of measurement. But it seemed to him that too much was made of the Act of 1860 being practically out of date. Probably it might be subject to revision; but it had always appeared to him to be a fair and reasonable position to take up between buyer and seller. It seemed to him perhaps the President had been misunderstood in his reference to the prepayment meter, because he thought that what he did mean was, not that he had a grudge against the prepayment meter, but that he would like to make it so simple or so unerring that there would be no more trouble with it than with an ordinary meter. But in the prepayment meter they had two instruments; and it could not be made so simple as a sailors' log or a cyclometer. He was glad to hear so many speakers say that the prepayment meter was a satisfactory instrument, popular alike with consumers and with companies and corporations. For it there was a splendid future still in view, and for the gas industry as well.

Mr. W. WILSON (Kirkintilloch) remarked that a number of the speakers had been very sore on the President; but they should remember that the amount of discussion arising upon a paper depended largely on how the matter was treated in the paper. The President could not have raised such an amount of discussion over the prepayment meter unless he had stated his views strongly. He was sorry for the manager of small works where prepayment meters were introduced wholesale, and he had no adequate assistance in attending to them, because they did find meters that were apt to go wrong, and the complaints which came in had to be seen to. Managers in big positions had officials to look after such matters. He had been connected with a firm of meter makers before becoming a gas manager, and he knew that meters could be turned out quite accurate; but he considered, with Mr. Macfie, that the Sales of Gas Act should be left where it was. It was a very fair arrangement. With regard to the nozzle shown, gas managers should adopt something like it for taking the carbon off the inside of the retorts. It was a very simple thing. The President was to be complimented upon filing his test papers every day. Managers of small works should endeavour to get an exhauster. He found that he saved 30 cwt. of lime per week in the winter time by getting a self-sealing one. With regard to the work done by purifiers, it would be well to have an exact analysis of the lime used on different occasions. Lime sometimes varied very considerably. What they wanted was an analysis, not of the limestone, but of the burnt lime. Perhaps the variations shown by the President might to a large extent have been due to changes in the coal used. He would like to hear a discussion upon the question of whether consumers should be asked to sign a document making themselves responsible for the money put in prepayment meter-boxes. Personally he thought they should.

Mr. M'LUSKY thought that, in a meeting like this, where they had managers from the very smallest works and from the very largest, if they could have a system of arriving at the value of coal, on a practical basis, leaving out of account such imported calculations as co-efficients, and other technicalities, they would come to a better understanding in regard to value. The cost of coal per candle-foot, for example, was a very nice figure to work upon on paper; but it was not one they could become familiar with and manipulate in the retort-house off-hand. The cost of the gas delivered into the holder was always a figure that one could remember and work upon, and compare with another. On inquiry, they would find that the cost per 1000 cubic feet of gas delivered into the holder ranged from 1s. to 1s. 2d. in the larger works in Scotland. In his own case, bringing all the coal to a common denomination, the cost was from 4·81d. to 7·24d. per 1000 cubic feet of the finished gas. This statement embraced only the net cost of the coal delivered in waggons. In regard to this, he would say that it mattered not to the gas manager where the coal was raised. The manager's chief concern was the price delivered in the works. If the collieries situated nearer asked a higher price, in order to derive advantage from their position, they often found those situated at a distance came in with better value in the competition. Taking into account the volume of gas, illuminating power, the weight of the heating matter in the coke (after deducting the ash), the gallons of tar, and the pounds of ammonia available, they had a gross value, in some cases, of 7s. 3d. per ton of coal for residual products alone. Then, deducting this 7s. 3d. from the price of the coal delivered, they had a figure which was divisible by the make per ton; and the result was the cost per 1000 cubic feet of gas from every ton of coal. All that was needed then to make up a common denominator was to add the cost of enrichment to the required standard. This might be, in some instances, 6 candles or more. If the enrichment were 6 candles, it was a question whether the coal was worth buying at all, unless cannel enrichment were to be taken into account, in which case the cost would settle the question. It was useless to discuss the question of oxide and lime, if they did not test their coal to ascertain its constituents before they began. Oxide purification might suit one gas-works very well; it depended upon the class of coal. There were shales in Scotland with which it was impossible to work with oxide at all, because what purifying they required was to be found in lime. In Perth, he got the percentage of carbonic acid down to 0·18, and the sulphur down to 7 grains per 100 cubic feet. This was a very comfortable state of matters. It was accomplished with a very small percentage of lime. They might use some shales considered to be good, and which were shown in the analyses to yield 13,000 cubic feet of 35-candle gas, but which, tested in the works, gave about 10,500 cubic feet of 25-candle gas. This was what they had to reckon with. But, leaving these out of account, they would find it possible to purify the gas, perhaps, with a lower percentage of lime, and have a greater economy of material and wages. He did not think consumers' meters affected leakage very much. The station meter did so to a greater extent. It was a very simple matter to reduce the water-line of the station meter, and sell more gas than they made; and it was a simple matter also to keep the station meter room fairly warm, and get a large make by measuring water vapour and other matters, including stretched gas. In such cases they would have a very big leakage, and a very big make per ton. They ought to study these matters before they disturbed the Sales of Gas Act.

The PRESIDENT opined that possibly some of the statements made in the discussion had been cancelled, as they used to say at school, by the remarks of other speakers. As to the use of the word in reference to prepayment meters, he did not do so in any diabolical sense, though he might have had occasion to do it if he had called to mind the troubles and the journeys he might have had to remedy the crooked pennies and that sort of thing. But he did not have this in his mind at all. What he meant was that he would be glad if there had been no need for the prepayment meter. The need had arisen through the change which had come over society. In Scotland, they used to be able to pay their accounts once a year, or once every half-year; but now they were in a great many places introducing quarterly and even monthly accounts, and by-and-bye they would be having weekly payments, and they would soon be having to pay for their gas in the same way. This must be owing to a sort of improvidence coming into fashion. The prepayment gas-meter had undoubtedly answered a felt want, or it would not be so popular. So, in the same way, did the penny machines at the railway stations; but who would think even of buying matches in this way? It was a very makeshift arrangement only; and gas companies, who felt their need for tapping lower strata, should look upon prepayment meters entirely as a makeshift arrangement, and not as a permanent one. Therefore the prepayment meter should not be looked upon as a thing to be boomed, but rather as a thing to be "damned"—by this he meant instead of being helped on—by gas managers. Some doubt seemed to have risen in the minds of a few regarding the value of the whitewashing of purifiers. Well, he mentioned the whitewashing as one of the ways by which they had more duty done by the purifiers. It was by no means the only way; but it was mentioned and given prominence to as indicating rather the manner in which he treated the boxes, and not as being the sole cause of the improvement. They would see, in the column for remarks, that improvement was effected by the introduction of a scrubber, and there the duty rose to the extent of over 50,000 cubic feet per operation. The next considerable improvement they effected was when they threw away the old, tumble-down and broken grids, and put in new ones. If they examined these figures at their leisure, they would see that this effected an improvement of something like 90,000 cubic feet per operation. Then they began to whitewash; and they would see that further improvement resulted in the average duty of these boxes. Then they came to whitewash every box; and this did not effect so much improvement as some of the other matters he had suggested. There was little difference in the character of the lime that was used. The lime from both North and South Ayrshire was very similar in character, though he did think that the lime they obtained from the South was better than the other. They would see that, in the year when they adopted the lime from South Ayrshire, the amount of gas purified fell 2000 cubic feet per operation; so that the improvement could not have been wholly due to the change in the lime. In making a saddle joint, he did not bore a hole in the main to let the service-pipe go into the main; he bored it the same size as the interior of the pipe, and then countersunk it, and, cutting the service-pipe a full length, he had nearly a gas-tight joint before he attached the saddle. The saddle then acted as a gland to keep the service-pipe in position; and when it was packed up, it made a perfectly gas-tight joint. It was, too, a joint which they could easily make in wet weather. He again thanked them for the patience with which they had listened to him, and for the interest they had displayed in the discussion.

Mr. M'LUSKY proposed that Mr. W. M'Crae, of Falkirk, be appointed to preside at their next year's meeting.

Mr. M'CRAE accepted office.

The company, with some friends, to the number of over 100, afterwards dined together in the hotel. In the course of the evening, a message was sent to Mr. M'Gilchrist, of Dumbarton, informing him of the success of the meeting.

The Available Coal Resources of Durham.—On Friday week, additional parts of the final report of the Royal Commission on Coal Supplies were issued; one of them (Part VI.) being a report by Sir Lindsay Wood on the available resources of Northumberland, Durham, and Cumberland. According to his estimate, the total quantity of coal remaining in the county of Durham is 5,271,116,346 tons, whereas in the 1871 report it was given as 4,723,363,390 tons; showing an increase of 547,752,956 tons in the present estimate. This is exclusive of 1500 million tons said to exist beyond 3½ miles and within 10¾ miles seaward.

The Leeds Water-Works Engineership.—At the meeting of the Leeds City Council last Wednesday, Mr. C. G. Henzell was unanimously appointed Water-Works Engineer to the Corporation, at a salary of £1000 per annum. Mr. Henzell, who is a member of the Institution of Civil Engineers, is 42 years of age. He served his apprenticeship at the works of Messrs. Armstrong and Co., at Elswick, and from 1880 he held an appointment in the office of the Newcastle and Gateshead Water Company. From 1884 to 1889 he was engaged as Resident Engineer in the construction of the West Hallington reservoir, which has a capacity of 785 million gallons. He subsequently held similar offices in connection with the Colt Crag reservoir and the River Bede extension. Since 1896, as mentioned last week, he has been superintending, as Resident Engineer for Messrs. T. & C. Hawksley, the construction of the Catcleugh reservoir of the Company.

Transactions of the Ohio Gaslight Association.

A substantial volume is that of the Ohio Association which has installed within its covers a verbatim account of the proceedings at the twentieth annual meeting held at Cleveland in March, 1904. A copy of the book has only just reached us; and therefore its production has not been carried out with the smartness with which Mr. Doherty has produced the "Question-Box" volume for the current year, notwithstanding that the latter volume is constituted of nearly 400 pages more than the transactions, and the collection of the material has only lately been completed. The transactions contain about 550 pages; and being printed on stout paper of excellent quality, they make a substantial book, which is exceedingly well printed. The technical contents are varied and interesting; and the volume, it must be said, is a solid testimony to a vigorous existence.

Job Lots of Mantles for England.

Our sympathetic natures permit us to stand a lot of things in England, but sympathy can be strained to breaking-point, and that point is fairly reached in the following advertisement which has appeared in the German paper "Zeitschrift für Beleuchtungswesen" for March 30—"ENGLAND: INCANDESCENT GASLIGHT ARTICLES. All kinds and any quantities of Wasters and Job Lots of Gas Mantles (seconds), Burners, Glass Goods, &c., are bought at once for Ready Cash." Offers are to be addressed to a number, care of the paper in question. We sincerely hope the gentleman or firm who think the wasters and job lots of Germany good enough for England will have his enterprising spirit damped, either by non-success in his quest, or by purchasing heavily and then finding that there are not sufficient innocents in England to make the game a profitable one.

Mr. Fenner's Paper on Sulphate of Ammonia.

In our abstract of the paper on "Ammoniacal Liquor and the Manufacture of Sulphate of Ammonia" read by Mr. R. L. Fenner at the last meeting of the London and Southern District Junior Gas Association (p. 27), a sentence occurred which it is to be feared may convey an unintended meaning to those who are not acquainted with the circumstances of the case. In speaking of the earliest method of dealing with the total ammonia by heating in a boiler by direct firing, and after the free ammonia had been driven off adding the alkali to expel the remainder, Mr. Fenner was made to say that this was the process carried on when his father had charge of the plant of the Beckton works. The plant mentioned by Mr. Fenner was, of course, as his father found it when he took charge of the works; and it was one of the first of many improvements he made there to introduce an up-to-date process for the distillation of ammoniacal liquor.

Costs of Arc Electric Lighting Per Hour.

In a published account of what the "Excello" arc electric lamps can accomplish—that is to say, an account in which all the advantages and none of the disadvantages of the lamps are set out—there appears a diagram composed of polar curves of candle power of three types of arc lamps tested at the Westminster Electrical Testing Laboratories. Beneath the diagram appears this interesting statement: "With current at 4d. per unit, the cost of 1000-candle power of light per hour is—With enclosed arc lamp, $5\frac{3}{4}$d.; open arc lamp, $3\frac{1}{50}$d.; and 'Excello' arc lamp, $1\frac{6}{25}$d." The "Excello" arc lamp therefore comes out cheapest. But as, by the high-pressure gas system, a light of 1000 candles per hour can be obtained for 1d., the "Excello" light is the dearer. An excess of $\frac{6}{25}$d. per hour does not appear to be much; but when it is multiplied by the number of hours lighting in the year, and by the number of lamps used, it puts another complexion on it. It means practically an addition of 25 per cent. to the cost of the high-pressure gas system for an equal illumination. Moreover, the makers of enclosed arc lamps and open arc lamps (which the figures show to be more expensive in working cost) do not speak very kindly of the "Excello" in respects other than that of cost per 1000 candles.

Visit to the Ilford Gas-Works.

Last Saturday week, the members of the "Gas Manufacture" class held at the Barking Technical Institute, visited the works of the Ilford Gas Company. By the kindness of Mr. A. A. Johnston, the Engineer, the party were conducted round the works by his Assistants, Messrs. Farquhar and Wade. Owing to the rapid increase of gas consumption in the Ilford district, various extensions of plant have been necessary in recent years; and therefore many examples of modern gas appliances are installed. The retort-house, for some time fitted with one bench of inclined retorts, has recently received a second, consisting of six settings of eights. The coke from these is (in the case of two settings at first) to be discharged from the retort-house floor to the coke-yard by means of Mr. Johnston's patented method of enclosed channels fitted with steam-nozzles, as described and illustrated in the "JOURNAL" for July 5, 1904, pp. 37, 38. The coal is brought to the breaker by means of Zimmer swinging conveyors, placed underground. This machinery, and the elevator belonging to it, is driven by horizontal steam-engines made by Marshalls, of Gainsborough; but in other instances gas-engines are employed as the motive power. The "blue" water-gas plant, the recently erected exhausters, boilers, economizer, gas washers, and scrubbers were also features that attracted special attention. The series of purifiers in which oxide of iron is used are fitted with "Standard" grids; and they have been found very effective in reducing the back-pressure. The works are well fitted with machine tools for the prompt repair of plant; and these, with the stove-repairing shops, governor-house, and laboratories, were viewed with interest.

Water-Works in South Australia.

The following are the principal artesian wells which have been sunk of late years by the Government of South Australia, with their depth in feet and daily production in gallons:—

Well.	Depth.	Yield.	Well.	Depth.	Yield.
Mirra Mitta . .	3534	400,000	Lake Harry . .	1360	120,000
Mungeraine . .	3370	600,000	Anacoora . . .	1250	700,000
Kopperamanna .	3000	800,000	Petermorra . .	1243	200,000
Dulkaninna . .	2226	1,000,000	Strangways . .	365	1,250,000
Lake Crossing .	1700	200,000	Hergott . . .	342	100,000
Yandama . . .	1620	430,000	Coward . . .	308	1,250,000
Oonadetta . . .	1571	270,000	William Creek .	229	20,000
Storm Creek . .	1551	86,000	Mount Gason. .	4420	500,000
Hamilton Creek .	1417	200,000	Coonanua . . .	2030	500,000

The aggregate daily supply afforded by these wells, so far as information is available, is estimated at 8,626,000 gallons. The expenditure made by the South Australian Government for the development of the interior by wells, reservoirs, and borings for artesian water has now been increased to £660,643. The annual revenue derived from these works is at present small, but their indirect advantages are great; they have already been attended with much success, particularly in the north-eastern portion of the State. It will be noted from the table that one of the deepest artesian wells sunk in South Australia is that at Mount Gason; and it is a remarkable fact that the water which flows from this well reaches the surface at the extremely high temperature of 204° Fahr. Quite irrespective of the supplies of water obtained from artesian wells, the Government have also carried out other works for supplying water to South Australian towns. The cost of these works has been £3,668,289; and at a recent date they were yielding a net revenue of £81,150; or nearly $2\frac{1}{4}$ per cent. per annum. The chief sources of the water supply are running streams, in which weirs are constructed to divert the water, when free from flood pollution, into large storage reservoirs. One of these—the Happy Valley—has a capacity of 2,950,000 gallons. The Adelaide Water-Works, with their head works and 634 miles of mains, cost £1,645,812.

The Acetylene Installation at Dose.

A paper describing the public acetylene plant at Döse was read last autumn before the Society of Gas and Water Engineers of Lower Saxony, by Herr Traubel, of Hamburg. Döse is a little place near Cuxhaven, at the mouth of the Elbe, which is increasing somewhat in importance as a watering-place. During the summer of 1901, it was decided to lay down acetylene plant of sufficient capacity to supply 5000 ten litre lights. The apparatus was erected in four separate buildings; one containing the generators, &c., a second the holder, a third being the carbide store, and a fourth having the heating appliances. Two carbide-to-water generators of somewhat unusual pattern were installed, each holding enough water at a charge to decompose about 6 cwt. of carbide. When carbide is inserted into the "shoot" of a generator, it falls through a layer of paraffin oil into a perforated basket; all the adhering air being thus swept off the lumps. In a few minutes' time, a chain is pulled which raises the basket out of the oil, and allows its contents to drain. After waiting a few minutes longer, the chain is pulled further, when the basket upsets and lets the carbide fall through another shoot at the side of the former one into the water in the decomposing chamber. By this arrangement, it is claimed that the acetylene is generated without any loss, and absolutely free from air. From the generating plant, the gas passes through a condenser, a washer, and a mechanical purifier filled with coke to the 1200 cubic feet holder, after which it traverses two purifiers charged with "Frankoline" arranged in parallel. A station meter and a governor complete the plant. The distributing system has been laid of double the capacity of the generating plant. Its maximum diameter is 4 inches; and it is a little over 5 miles long. When the main was new, leakage occurred at the rate of 0·4 cubic foot per mile per hour; but after tightening the cocks of the 114 street-lamps it fell to 0·3, and after a final adjustment of some other cocks to 0·177 cubic feet. The incandescent light was introduced successfully during 1903. At the beginning of last year, the main was lengthened to reach the village of Duhnen, about $\frac{3}{4}$ mile away, where there is a "Kurhaus" (with 220 acetylene lights), and other attractions; and now it is proposed to supply two large forts in the neighbourhood. From other sources of information, it may be mentioned that Döse has a population of about 2000, in 350 houses; and that by January, 1903, 46 houses, with 385 burners, were connected to the mains, in addition to the public lamps. At that time, the acetylene was sold at 2 marks per cubic metre—*i.e.*, at about 5s. 6d. per 100 cubic feet.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Hitchin and District Gas Bill.

SIR,—The refusal to insert a purchase clause in this Bill, by a Committee of the House of Commons, will come as a great relief to a considerable number of the smaller gas companies. Perhaps we may now hope, without being unduly sanguine, that the case which made so strong an impression upon the Committee will in due time make an equally strong impression upon the Committee of the House of Lords, and with the same result.

It is an advantage to the public that a company should be placed under statutory restraints, and to the company that it should have statutory powers. But even the best-managed companies have been afraid to go to Parliament, because it has been known that it was almost a certainty that a purchase clause would be forced upon them. If this unjust custom should now be broken down, I venture to prophesy that in the next session of Parliament there will be a great increase in the number of Gas Bills; and our friends (or enemies?) the Parliamentary Counsel, Agents, and Engineers may confidently look forward to better times, so far as these Bills are concerned. H. R.

The Five Cubic Feet Rate of Testing Low-Illuminating Power Gas.

SIR,—I have read with some surprise the opening passage in the letter from the President of the Institution of Gas Engineers on the above subject, in your issue of the 4th inst., which is as follows: "With regard to the several suggestions that have been made to me that the Institution of Gas Engineers should follow up their recent action in memorializing the Board of Trade in reference to the very unjust method of testing gas for illuminating power recommended in the report of the Departmental Committee."

I desire to ask when the Institution decided to memorialize the Board of Trade. As a member, I have no knowledge of this matter being before the Institution, except at the conclusion of last year's annual meeting, when a vote was taken on the motion of the Retiring President and seconded by Mr. Irving himself. This motion, however, was irregular and altogether out of order, as no previous notice of it had been given.

I now beg to respectfully suggest to the President that he should allow the question of following up the already unauthorized Memorial to the Board of Trade to stand over until such time as he is duly and properly authorized to act, when it will doubtless transpire that the views he himself enunciates do not represent the unanimous opinion of the members of the Institution.

Widnes, April 7, 1905. ISAAC CARR, M.Inst.C.E.

The "Squeezing" of Incandescent Mantles.

In a letter from Messrs. Oberfelt and Co., of Berlin, reference is made to the above subject; and it is one to which the attention of gas suppliers has been drawn by their own experiences. "A new period," say the firm, "seems to have begun for the incandescent mantle trade, as, on account of a 40 per cent. over-production, several Continental firms have been trying to cut the prices down to below cost—that is, if they, for the prices quoted, would only deliver goods of first-class quality. One mantle looks much like another. The difference of quality comes in with the quantity of thorium the mantle contains. To catch the trade, firms show mantles which are, for instance, made at the rate of 900 from a kilo of thorium, quoting (say) 19s. per gross; but if an order is given, goods are delivered which are made at the rate of about 1200 per kilo. Anyone who has analyzed mantles will understand and believe that expensive mantles are much cheaper than low-priced ones on account of their durability, which can never be the same in a mantle sold at a cut price. Therefore it is to the consumer's interest to refuse offers of such cheap trash."

Gas v. Electricity.

At a certain licensed house (writes a correspondent) lit entirely by the electric light, current alone cost during the last twelve months within a few pounds of £200. The lighting was considered very dismal; and the cost very excessive. On being consulted in regard to the matter, I proposed a thoroughly impartial demonstration and test of the illuminating power and cost of gas and electric lighting side by side in the same room. This room is 24 ft. by 19 ft., and was formerly lighted by sixteen 16-candle power electric lamps. In one half of the room, eight lamps were continued, and a separate electric meter was put in for them. In the other half of the room, I had fixed two pendants, each carrying two incandescent gas-burners, and to them I attached a test gas-meter. The illuminating power of the eight electric lamps (8 × 16), to give them the full candle power claimed, was 128 candles; while that of the four incandescent gas-burners was from 250 to 350 candles. But leaving out the actual candle power, it is sufficient to say that the light from the gas is noticeably far the brighter, and is giving great satisfaction. The cost of each system in use for the first seven days, March 27 to April 3, was: Electric lamps, 25 units at 4d., 8s. 4d.; gas, 1000 cubic feet, 2s. 3d. From April 3 to 6, the consumption has been: Electric lamps, 12 units at 4d., 4s.; gas, 446 cubic feet, 1s. As we have the arrangement in use for lighting from a distance with a switch the same as in the case of electric lamps, and fixed by the side of the electric switches, the gas-lights are just as convenient as the electric lamps. The room is 15 feet high, and well ventilated. I am contracting for the maintenance of the burners and mantles at a small fixed annual charge; but the main point is that the proprietors will save over £100 a year on their lighting!

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills brought from the Commons, read the first time, and referred to the Examiners: Accrington District Gas and Water Board Bill, Epping Gas Bill, Higham and Hundred of Hoo Water Bill, Loughborough Corporation Bill, Morley Corporation Bill, South Suburban Gas Bill, Wrexham Gas Bill.

Bills read a second time and committed: Brompton, Chatham, Gillingham, and Rochester Water Bill, South Metropolitan Gas Bill, Walker and Wallsend Union Gas Bill.

Bills reported: Torpoint Water Bill [preamble not proved], Truro Water Bill.

Bill read the third time and passed: Hessle Gas Bill.

HOUSE OF COMMONS.

Tuesday, April 4.

THE LIGHTING OF NEW PALACE YARD.

Sir HENRY FOWLER asked the honourable member for Chorley, as representing the First Commissioner of Works, what would be the cost of converting the twelve gas-lamps in Palace Yard and Speaker's Court, which give the minimum of light, into incandescent lamps of the type with which all the other lamps in Palace Yard are equipped.

Lord BALCARRES: Conversion means new lanterns in each case, and the cost per lamp has hitherto averaged £10, or a total of £120.

LONDON MUNICIPAL EXPENDITURE.

Mr. W. F. D. SMITH asked the President of the Local Government Board whether he would grant a return showing, since 1893, the total amount of money expended, and the rate in the pound raised, for all county purposes, including education, in the County of London, and for all local purposes by Vestries and Borough Councils respectively.

Mr. GERALD BALFOUR submitted a tabulated statement, extracted from the published local taxation returns, which he hoped would give the honourable member the information he desired. The following are the figures for the first and last years in the period named:—

	1895-6.	1902-3.
Expenditure—		
London County Council (excluding capital expenditure and loans to other local authorities)	£2,450,822*	£4,575,077*
London School Board (excluding capital expenditure)	2,208,640	3,136,634
Metropolitan Vestries and District Boards† and Metropolitan Borough Councils (excluding expenditure out of loans and payments under precept to other local authorities).	2,657,948	4,644,797
Average rate in the pound of rates raised for the purposes of the—		
London County Council	1s. 2·9d.	1s. 3·3d.
London School Board	0 10·3	1 2·7
Metropolitan Vestries and District Boards†	1 5·9	—
Metropolitan Borough Councils . .	—	2 0·1

* Excluding the amounts distributed by the London County Council to Sanitary Authorities under the London (Equalization of Rates) Act, 1894; this expenditure being included under the heading "Metropolitan Vestries and Districts Boards."

† Including the Woolwich Local Board of Health.

LOCALIZING LEAKAGE FROM ELECTRIC MAINS.

Sir THOMAS DEWAR asked the Secretary to the Board of Trade if his attention had been called to a recent action against the Corporation of Manchester, in which the plaintiffs succeeded in recovering damages for losses sustained through a fire caused by an explosion in one of the Corporation's electrical mains; and, seeing that the plaintiffs based their claim on the ground that the linking-up system laid down in the streets of Manchester caused a difficulty in localizing leakage, and constituted a public danger, if he would state whether this system was generally adopted in London, and whether any improved one had received the consideration of the Board of Trade.

Mr. BONAR LAW said the attention of the Board had been called to the action referred to. An improved system, in which the mains were separated into sections connected by suitable fuzes, and whereby the difficulty in localizing leakage and consequent risk were much reduced, had received the consideration of the Board, and had been adopted in all undertakings established during the last two years in London and elsewhere. He also understood that this system had been applied voluntarily to many existing undertakings in London.

Wednesday, April 5.

LOCAL TAXATION.

Mr. PURVIS moved—"That, in view of the distinction, affirmed in the main report of the Royal Commission on Local Taxation, between services preponderantly national but generally onerous to the ratepayers, and services preponderantly local which confer upon the ratepayers a direct and peculiar benefit more or less commensurate with the burden, no arrangement of taxation is equitable which does not provide that local authorities have an amount assigned from the Imperial taxes fully representing the interest of the general community in local expenditure on onerous services."

Mr. SPEAR seconded the resolution.

Sir F. BANBURY, who was received with Opposition laughter and

cheers, continued the debate; and he was speaking at midnight, when it stood adjourned.

The following further progress has been made with Bills:—

Bill brought from the Lords, read the first time, and referred to the Examiners: Hessle Gas Bill.

Bill read a second time and committed: Malvern Water Bill.

Bill reported: Colne Corporation Bill.

Bills read the third time and passed: Accrington District Gas and Water Board Bill, Epping Gas Bill, Higham and Hundred of Hoo Water Bill, Loughborough Corporation Bill, South Suburban Gas Bill, Wrexham Gas Bill.

On Thursday, Mr. Bonar Law presented a Bill "to amend the Acts relating to electric l hting," and Sir Alfred Hickman another "to amend the law relati e to Trades Unions;" and they were both read the first time.

RATHMINES AND RATHGAR EXTENSION AND IMPROVEMENT BILL.

The Alliance and Dublin Gas Company Granted Locus.

Last Tuesday, the Court of Referees of the House of Commons—Mr. H. D. GREENE presiding—had before them the above-named Bill in connection with a petition which the Alliance and Dublin Consumers' Gas Company sought to be heard upon when the Bill is considered by a Committee.

Mr. PADDON, representing the Company, said by clause 7 of the Bill power was sought to extend the area of the Rathmines and Rathgar Urban District Council and to apply to the extended area various Local Acts, including the Rathmines and Rathgar Township Electric Lighting Order of 1896. If the Bill were approved, the promoters would be entitled to distribute electricity for illuminating purposes in the added area. Competition would therefore be created with the Alliance and Dublin Gas Company, because under their statutory powers they had been for nearly forty years distributing and selling gas in the proposed additional district, in which they had many miles of mains and more than 200 consumers, and were large ratepayers. The competition would be entirely new; and they therefore sought to have it limited in the way in which Parliament had done this in the large majority of cases in which they had been applied to. The Act of 1896 simply authorized the promoters to supply electric light; but in 1899 they entered into an arrangement with a private Company, under which they also sold electrical fittings and appliances. It could not be contended that this arrangement was not *ultra vires;* and by clause 47 they sought to legalize it. Then by clause 48 the promoters took further powers to supply electrical fittings. In these circumstances, Counsel submitted that the Company should be allowed to appear against the Bill, in order that the competition might be regulated. In the added area, the Gas Company paid upwards of £300 per annum in rates; and they naturally objected to have their business competed with by means of money supplied by themselves. In support of his argument, he cited the cases of the Shropshire Electric Power Extension Bill and the Swindon Corporation Bill, in both of which *locus* had been granted to the gas company concerned.

Mr. GREIG, in reply, said that, in regard to the existing area, it had already been decided in the Willesden Urban District Council Bill of 1903, in which the Gaslight and Coke Company sought to come in on exactly the same footing as the Company in the present case—namely, to oppose the fittings clause—that *locus* could not be allowed.

Mr. PADDON remarked that in that case they had the Bermondsey clause.

Mr. GREIG said the Bermondsey clause was not in the Willesden Bill originally. The Court came to the conclusion that all that was done in that case was to improve an already existing competition; and this was what was being done here.

Mr. PADDON: But in the Willesden case there was a clause already inserted covering the Gas Company.

Mr. GREIG: Not in that case.

Sir CHANDOS LEIGH: In the Willesden case, there was nothing identical with clause 47 of this Bill.

Mr. GREIG: Clause 47 is a mere power to purchase another Company's business in the district.

Sir CHANDOS LEIGH: You are getting statutory powers to purchase the Company.

Mr. GREIG submitted that this did not do anything more than improve competition already existing. The competition as regarded the old area would be so little different that it would be merely improved competition, in which case the Gas Company were not entitled to *locus*. As regarded the new area, practically the same principle would apply.

Further discussion having taken place, *locus* was allowed against clauses 7, 47, and 48, which was practically all that was sought.

French Incandescent Gas-Light Company.—The net profits of this Company for the past year amount to £30,270, compared with £23,000 in 1903. It is proposed to pay a dividend at the rate of £1 on each £4 share; being the same rate as in the preceding year.

Proposed Rebate to Penny-in-the-Slot Consumers at Leeds.—At the meeting of the Leeds City Council last Wednesday, Mr. J. H. Barraclough proposed—"That it be an instruction to the Gas Committee to make arrangements to return (in money, as near as is practicable) to those citizens burning gas through penny-in-the-slot meters in Leeds an equivalent to the reduction embodied in the motion of Councillor Clarke, and passed by the Council on the 4th of October, 1904, the reduction to be effective as from the 9th of November, 1904." It was decided to refer the matter to the Gas Committee for inquiry and report.

LONDON ELECTRICITY SUPPLY BILLS.

THE POSITION OF GAS COMPANIES.

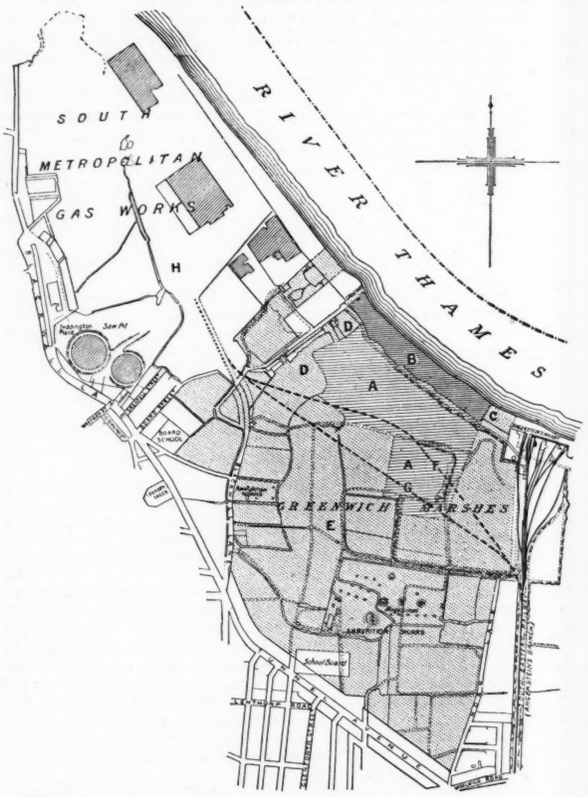
During the early stages of the consideration by the Select Committee of the House of Lords—presided over by the EARL OF CAMPERDOWN—of the Administrative County of London and District Electric Power Company's Bill (some portion of the proceedings on which was noticed in the "JOURNAL" for March 28, p. 857),

Mr. BALFOUR BROWNE said: My friend, Mr. Fitzgerald (for the promoters of the Bill), inadvertently on the last occasion remarked that he thought the South Metropolitan Gas Company's opposition was merely a matter of clause. I daresay he fell into the error because I had only cross-examined upon a question of clause; but the opposition is one to the preamble.

The CHAIRMAN: Of course, we know that every opposition always ends up by saying that the preamble cannot be proved.

At the conclusion of the case presented on behalf of the Local Authorities in opposition to the Bill on Thursday,

Mr. BALFOUR BROWNE, for the South Metropolitan Gas Company, said they had thought it more convenient to deal with the matters in groups, and they had now dealt with all the Local Authorities. They had two petitions from two Gas Companies—one as to taking land at Greenwich which belonged to the South Metropolitan Gas Company, and another a proposal to take land at Fulham which belonged to the Gaslight and Coke Company. The oppositions would be very short. He would call one witness—the Chairman of the South Metropolitan Company—and address a few remarks to the Committee afterwards.



The CHAIRMAN: As I have said, with regard to the South Metropolitan Company, I shall take no part. I rather hoped that you had arrived at an arrangement about the land—at least, you appeared to be satisfied at the time.

Mr. BALFOUR BROWNE: No, my Lord.

Hon. J. D. FITZGERALD: My friend, when he was cross-examining our witness, suggested the terms which would satisfy him.

Mr. BALFOUR BROWNE: No, indeed, I did not. I suggested terms, but not terms which would satisfy me; and you have not given us the terms.

Hon. J. D. FITZGERALD: I certainly so understood. The moment my friend made the suggestion, we were quite willing to meet him on that basis, and our Engineer wrote to their Engineer asking for a meeting in order that the precise terms might be agreed. The Engineer of the South Metropolitan Company declined to meet our Engineer, and said the matter was in Sir George Livesey's hands. Thereupon our Parliamentary Agent wrote to the Agent on the other side asking for an interview; but that interview has never been accorded. Therefore we have done everything possible to meet them and agree terms.

The CHAIRMAN: Whatever you may have done, I am afraid that does not preclude Mr. Balfour Browne from appearing here.

Mr. BALFOUR BROWNE: Your Lordship said you would not take part in the matter.

The CHAIRMAN: No; I shall remain in the chair. But as to any debate or any vote I shall take no part at all.

THE SOUTH METROPOLITAN GAS COMPANY'S OPPOSITION.

Sir *George Livesey*, examined by Mr. BALFOUR BROWNE, said that the principal works of the South Metropolitan Gas Company were situated at East Greenwich.

Mr. BALFOUR BROWNE: I think the yellow on the map [H on plan] shows the site of your existing works?

Witness: Yes; we purchased the yellow land in 1881. We began to erect works in 1885; and in twenty years we have practically filled this part up.

Witness described the plan as to the position of the South Eastern Railway and the original site of the Company, and said that they intended to make a railway [G] across a certain part.

Then, in 1902, did you obtain power from Parliament to acquire all the lands coloured pink on the plan [the dotted portions C, D, and E]?—Yes, we did. We looked at it in this way: Here is this land fast filling up; we have no reason to suppose there would be a falling off in the use of gas; and where are we to build additional works? There was no suitable land obtainable unless we went below Erith. We therefore thought it well to ask Parliament to grant us power to purchase this unoccupied land in order to provide for the future.

When you promoted your Bill you scheduled not only the pink land but some more shown in brown?—Yes; Messrs. Redpath, Brown, and Co. had secured part of it [A]. We wanted a portion for frontage [A and B]; and we scheduled this. But Parliament would not grant compulsory powers. We had already purchased the pink ground before going to Parliament; but that does not give us nearly enough frontage. For instance, we shall probably want to put out a jetty; and we really want that land badly.

Lord ZOUCHE: To whom does it belong now?

Witness: This land belongs to Messrs. Redpath, Brown, and Co. It originally belonged to the Ecclesiastical Commissioners; and I think Messrs. Redpath, Brown, and Co. got it at £50 an acre for 999 years.

Mr. ROSTRON: They resisted your claim on the ground that they wanted the whole of the land for their own purposes?

Witness: Yes; but that is a mistake evidently. The Committee tried to bring us together; but Messrs. Redpath, Brown, and Co. said: "We cannot part with any of the land," and the Committee said: "We cannot force them to re-sell."

Hon. J. D. FITZGERALD: If we are going to re-try that case, it will take some time. I was Counsel for Messrs. Redpath, Brown, and Co., and they said a great deal more than that.

The CHAIRMAN: We are not going to re-try that case; we have quite enough to do without that.

Mr. ROSTRON believed that Mr. Cowan, the Chairman of Messrs. Redpath, Brown, and Co., was one of the promoters of the Bill.

Witness said that was so. In the result, they only got in 1902 a little bit of frontage [C]. He added that the piece of land which the promoters of the present Bill had scheduled included the whole of the South Metropolitan Company's frontage; and also the land on which the railway is to run. It was impossible to part with that piece of land without really spoiling the whole site. They must have access to the river. They were beginning to use the land already. A gasholder was being erected there. If they were deprived of this land, he did not know where they would go, or what they would do.

Answering Mr. ROSTRON, witness said they objected also to the wayleave which was wanted over their land. They did not know what effect the mains might have on their pipes, and besides there was an access. There was a public path; and they could get access to the road. They objected altogether to having their land cut in two.

The CHAIRMAN: In order that the Committee may be quite clear, do you propose to put your generating station on the pink land and on a little bit of the brown [partly on A, C, and E]?

Hon. J. D. FITZGERALD said they proposed to put the generating station on part of the brown land [A].

The CHAIRMAN: Are Messrs. Redpath, Brown, and Co. appearing against you?

Hon. J. D. FITZGERALD: No; they have withdrawn their petition.

Mr. BALFOUR BROWNE: The Chairman of that Company is one of the promoters.

Hon. J. D. FITZGERALD: It does not make any matter whether he is or is not. In fact, they did present a petition against the Bill; but the petition is not now appeared on. We should have liked a portion of the pink land; but the moment it was stated on behalf of the South Metropolitan Gas Company that they could not afford to part with any portion of it, we were willing to come to an agreement with them on that basis; and we have been endeavouring ever since it was stated a fortnight ago to get an interview with Sir George Livesey or his Engineer for the purpose. But every attempt has been frustrated. We were willing to withdraw from our Bill the compulsory powers over the pink land which belongs to the South Metropolitan Gas Company; and I should have thought that was an end of the matter. But the South Metropolitan Company will not even agree that we should withdraw the compulsory powers over their land.

The CHAIRMAN: Well, what do they want?

Hon. J. D. FITZGERALD: I do not know what they want except to oppose the Bill.

The CHAIRMAN (to witness): Surely, if they wish to take your land and you object, upon which they say, "We will withdraw that portion of our Bill which relates to your land," is not that sufficient for you?

Witness: Yes; but so far as I understood the matter, it was this. They said: "We will withdraw the request for compulsory powers to take your land, providing you will let us use your railway."

The CHAIRMAN: Mr. Fitzgerald did not say that?

Witness: And I said: "That is asking something for nothing."

Hon. J. D. FITZGERALD: That is one of the matters we wanted to negotiate about.

The CHAIRMAN: But you did not say that.

Hon. J. D. FITZGERALD: But it seemed reasonable that, if we gave up acquiring any portion of the land, that they should allow on the usual arbitration terms—that is, a payment—the machinery and so forth for our generating station to come by railway across the siding, and not compel it to be taken by railway down to the station and carted all the way round. It was for the purpose of meeting Sir George Livesey or the Engineer, and seeing if perfectly equitable terms could be agreed, that we wrote; but neither Sir George Livesey nor the Engineer would meet us. It is, however, after all, only a clause question—whether we should not be entitled to ask your Lordships for leave to use the sidings, when made, on the usual arbitration terms. As far as taking any portion of the land belonging to the South Metropolitan Gas Company is concerned, we were willing to abandon that altogether; and I should have thought this would have satisfied them.

The CHAIRMAN: Then it really becomes a question of clauses.

Mr. BALFOUR BROWNE: No; it becomes a question of preamble, if you will allow me.

The CHAIRMAN: Very well, Mr. Fitzgerald, you say you thought it reasonable that permission should be given you to use the railway for the purpose of your machinery. Did you intend the wayleave to be limited to this purpose only, and to cease the user when you had conveyed your machinery, or did you intend that the wayleave should become a right of using the railway for all time?

Hon. J. D. FITZGERALD: We intended it should become a right of using the railway generally. It really is this: Where you have a large work of this sort, of course, you have more traffic when you are constructing it; but as the work goes on and additions are made, or as new machinery is required, you need to use (or it is a convenience to use) a siding of this kind. We therefore propose to take power. This is, as my friend says, a statutory siding created under the powers of an Act of Parliament; and there is nothing whatever unreasonable that another person adjoining should have power to use it on the usual terms—that is, on the terms of paying whatever an arbitrator says is reasonable.

The CHAIRMAN: That I may be quite sure I am following you, this railway, which you propose to ask the user of, is a private railway—it connects with some public station, I suppose?

Hon. J. D. FITZGERALD: It connects with the South Eastern.

Witness: Originally it was to go across Messrs. Redpath, Brown, and Co.'s land; but we have altered the course, and it is to be entirely on our own land, interfering with no one.

The CHAIRMAN: And you are proposing to ask the right to use that for all time, Mr. Fitzgerald?

Hon. J. D. FITZGERALD: Of course, on payment.

The CHAIRMAN: Quite so. I did not suppose it was for nothing. I think now we know the actual facts.

Hon. J. D. FITZGERALD (in cross-examination): What harm would it do you if the siding is used for the conveyance of machinery and material to the generating station of the Power Company?

Witness: I do not know it will do us any harm. I have no objection to electric lighting as a competitor. I believe in competition.

Then, as I understand, you have no objection to the promoters having a right to send machinery and material by the siding on to their own land on payment to you; the amount of the payment, if you cannot agree to be fixed by arbitration?—I have no doubt we could agree. But I object to those wayleaves.

Mr. BALFOUR BROWNE: That is the only evidence for the South Metropolitan Gas Company. My learned friend is not quite right when he says that there is nothing between us; there is a great deal. They propose by their Bill to take property which we, a statutory Company, obtained leave to buy only two years ago. Then at the last moment they withdrew. It is a most improper thing for promoters to bring a Company here, at great expense, and then to tell them: "We do not want your land at all, we want to run over your railway." This running over the railway is an entirely new idea. There is nothing about it in the Bill. It looks a very simple thing; but do the Committee know the facts? We wanted the whole of the land last year; but Messrs. Redpath, Brown, and Co. (who are now promoters of this Bill) came before Parliament, and said: "Whatever the needs of the South Metropolitan Company are, they shall not have our land—we require it for our own works."

Hon. J. D. FITZGERALD: That is not a fair representation.

Mr. BALFOUR BROWNE: I was in the Bill, and I cross-examined. They said; "We require it for our own works, and do not want to sell it." What do they do now? They promote this Bill. They are prepared to sell it to this Company; and Mr. Cowan, the Chairman of the Company, is the principal trade witness for the promoters. We wanted the land for the very purpose of getting a frontage to the river; and what do they do? They curtail our frontage to a very little bit of land. It is a hardship that those people who resisted our scheme to get the land should now go and sell it to a Company who really have no more title to take the land for public purposes than we have. There is not a word in the Bill about using our railway. What they do propose is to make a railway for themselves over our land.

The CHAIRMAN: But they do not propose to make the railway, do they?

Mr. BALFOUR BROWNE: Yes; they propose to take land for the purpose of making a railway.

The CHAIRMAN: But now they only ask for a wayleave over your railway when made.

Mr. BALFOUR BROWNE: There is nothing in the Bill about that. They have never asked for running powers over our railway; and they cannot get them. What they did ask was to have power to take our land to make a railway for themselves. Therefore they are changing their front as they go along to suit their own case; and I protest very strongly against either of their proposals. We desired, and desire now, if this land is to be sold, to have it. It was only because they said they wanted it for their own purposes that we did not get it. That is the whole case; and I will ask the Committee first to strike out from the Bill any power to touch our land, and, secondly, any power to take any of our land for the purpose of getting a wayleave over it. As to the railway, there is nothing in the Bill regarding it; and therefore they cannot get it.

The CHAIRMAN: Did they propose to take any part of your land for the purpose of getting a wayleave?

Mr. BALFOUR BROWNE: Yes.

The CHAIRMAN: I was under the impression that it was a railway of yours that they were going to use.

Mr. BALFOUR BROWNE: That is what my friend, Mr. Fitzgerald, said at the last moment, and what I say has been invented within the last five minutes. It is not in the Bill. It is simply monstrous; I cannot say more. With regard to the Gaslight and Coke Company's case, my

friend, Mr. Wilkinson, who is with me, will address you on behalf of them; and I think the attitude with regard to that Company also monstrous.

THE GASLIGHT AND COKE COMPANY'S CASE.

Mr. WILKINSON said he appeared on behalf of the Gaslight and Coke Company. Their Lordships would remember that by clause 30 of the Bill, compulsory powers were sought by the promoters to acquire land for the purpose of two other generating stations. The generating station to which he wanted to draw attention, and which belonged to the Company he represented, was in the parish of Fulham. He asked the Committee not to allow the Bill to proceed, because the promoters had shown in this case no justification at all for taking the land. He wanted to deal with the case rather generally, and then to direct their attention to particular evidence which had been given by the promoters to make a case for taking this particular land. Their Lordships knew that, when promoters of an electric undertaking came forward and asked for compulsory powers to take land, they had a very wide field before them within which to choose the particular sites which they proposed to occupy. It was not at all like the case of a railway company, where the route was determined very often by engineering difficulties or by physical considerations. He wanted to direct their attention to the exact evidence which had been put forward for poaching upon this particular piece of land, and saying to Parliament: "This land and no other is necessary for the purposes of this scheme." Of course, the land was situated on the ring main, and it was in the parish of Fulham. The promoters did not come and say that was the only line possible for the ring main to take in order to give a supply. They simply marked a provisional route on the map; and they themselves had admitted in evidence, and it was part of their case, that it was subject to alteration. This being so, there was no evidence before them that it would not be possible to alter the route of the ring main in order to avoid taking the land which the owners had an objection to sell. Then there was a second objection. Their Lordships would see the ring main, as it was delineated on the plan, passed for some distance along the river on the south, and for some distance upon the north; so that it was obvious, from a consideration of the plan, that it was not the only possible site for them to put a generating station upon. They might have selected other sites. At any rate, there was no evidence before them that there was no other site available for their purposes. It was for the other side to prove their case affirmatively. They sought to take his land; and he submitted they must make out the case why they should take his rather than any other. The learned Counsel proceeded to quote extracts from Mr. Merz's evidence (which he said was the only evidence given by the promoters on the subject) to support his contention that there was no reason why this particular site should have been chosen. There was, he went on to say, no evidence to show that they could not have gone 200 yards higher up the river or 200 yards lower down. But the case did not rest there, because the promoters intended, if they got their Bill, to enter into competition with the Gaslight and Coke Company.

The CHAIRMAN: If I remember aright, they are only to generate gas for the purpose of their own undertaking—electricity.

Mr. WILKINSON: In answer to a question by me, Mr. Merz said: "I hope we should take some of your gas-engine consumers."

Hon. J. D. FITZGERALD: That is not by selling gas, but by supplying electric power.

Mr. WILKINSON: I quite follow that; and my submission is that we are to some extent competitors. In so far as we supply gas for power, we shall come into competition with the electricity; and I do submit that it is a very great hardship—especially on evidence which is no evidence at all—that we should have to grant facilities to people who would use them for the purpose of competing with us. I think the Committee ought to ask that a stronger case should be made out where competition was concerned than they would ask to be made out with regard to an ordinary landowner; and my submission is that there has been no case at all made out for the compulsory acquisition of this land. I therefore ask you not to allow the Bill to proceed so far as it concerns the land of the Gaslight and Coke Company.

Mr. WILKINSON having announced that he did not propose to call any evidence,

Hon. J. D. FITZGERALD: There really is a matter here on which I think I am entitled to make an observation. The land in question is publicly advertised for sale by the Gaslight and Coke Company.

The CHAIRMAN: You will have your opportunity of saying that.

EALING CORPORATION BILL.

Insertion of the Duke of Northumberland's Clause.

On Monday last week, the Police and Sanitary Regulations Committee had under consideration the Bill promoted by the Ealing Corporation, the object of which (*inter alia*) is to confer upon them further powers with respect to their electric lighting undertaking. Opposition was at first offered by the Brentford Gas Company; but this was withdrawn on certain alterations being made in the Bill. In the clause enabling the Corporation to supply electrical fittings, an amendment was introduced to the effect that they were to take such remuneration, rents, and charges therefor as should cover the entire cost; and no expenses incurred in giving effect to the provision of the section, or in any way arising therefrom, were to be "charged upon the borough fund or borough rate." A new clause (12 A) was also inserted. On this being reached, Mr. Gerald Fitzgerald, for the promoters, informed the Committee that it had been inserted at the instance of the Gas Company. There had been great controversy about the clause. At times it had been allowed, and at others disallowed; but, having regard to the attitude of the House of Lords towards it, the Corporation had agreed with the Company to insert it. The clause was not usual. On the contrary, the view of the Committee had been in some cases decidedly against it on principle. Where, however, there had been a contest, it had often been put in; and in one case the House of Lords had inserted it after the Committee had refused to do so. Mr. Baggallay, K.C., said the clause had been fought in a number of cases before the Duke of Northumberland, and the Committee in the case modified what had been known as the Bermondsey clause; and this was the one which it had been agreed should be inserted in the Ealing Bill. The Committee assented to the clause, and to other minor amendments to meet the Company, and then proceeded to deal with the other portions of the Bill.

BRISTOL CORPORATION BILL.

Protecting Clauses for the Gas Company.

This Bill, under which the Corporation of Bristol seek various powers, was last week before Section B of the Police and Sanitary Regulations Committee—Mr. BILL presiding. The Bristol Gas Company had offered opposition; but they withdrew it on the promoters agreeing to insert protecting clauses to the following effect: Before commencing any works which will interfere with the Company's mains or pipes, plans, sections, and particulars thereof are to be furnished; and if the Company do not approve of them within fourteen days, the works are not to be proceeded with until the plans have been agreed or settled by arbitration. The Engineer of the Company is, if thought fit, to have the sole direction and management of, and may at the cost of the Corporation execute, all such works as may be reasonably necessary for the diversion, shoring up or supporting, or otherwise altering the position of, and restoring and protecting, any mains, pipes, service-pipes, or apparatus which it may be necessary to interfere with by reason of the execution of the works authorized by the Act, and for preventing any interruption to the supply of gas, or any obstruction or increased expense to the Company in the repair, renewal, or inspection of such mains, pipes, service-pipes, or apparatus. All costs, charges, and expenses reasonably incurred by the Company or their Engineer in respect of supervision of the works are to be paid by the Corporation on demand. If any interruption or loss occurs in the supply of gas owing to any act or omission of the Corporation or their contractors, agents, or servants, the Company are to be indemnified; and they are also to be held harmless from all claims and demands upon or against them by reason thereof. If, in consequence of any works executed by the Corporation, the Company's mains have to be changed or increased in length, or the positions altered, the Corporation are to bear the cost; but if the substituted mains are of larger dimensions than those they replace, the Corporation are not to be bound to pay the Company the increased cost occasioned. Whenever any mains or pipes are rendered unnecessary, they are to become the property of the Corporation, who are to pay the Company for equivalent lengths of pipe and laying the same. In the event of any difference arising between the Corporation and the Company, it is to be determined by an engineer to be appointed (unless otherwise agreed upon), on the application of either party, by the President of the Institution of Civil Engineers; and the provisions of the Arbitration Act, 1889, are to apply. The Bill is still before the Committee, and will be considered again to-day.

COLNE CORPORATION BILL.

Discounts and Prices for Power Gas.

On Monday last week, Section B of the Police and Sanitary Regulations Committee—Mr. BILL presiding—considered the Bill of the Colne Corporation, under which further authority is sought with regard (*inter alia*) to gas matters.

Mr. KEEN, who appeared for the promoters, said Part III. of the Bill, which related to gas, contained clauses which were all in the ordinary form, and were taken bodily from the Doncaster Act of last year. The first dealt with prepayment meters, and was now granted in many Bills, though there were differences as to the price allowed to be added in respect of the hire of the prepayment meter.

Mr. *Alfred Varley*, the Town Clerk of Colne, was called with respect to clause 21, under which authority is sought to allow discount.

Mr. WHITLEY (a member of the Committee): I suppose what you really want is power to allow larger discounts for motive power?

Mr. KEEN: It is not only for prompt payment, but for large consumption. Unless there is a provision like this for discount, we are bound, under the law, to treat all consumers alike. We cannot, by agreement with a consumer, say, "You shall have so much off as discount. (To witness:) Are you doing much in the way of supplying power for gas-engines?

Witness: Not much; but we are cultivating that branch.

Mr. WHITLEY (to witness): Is the smallness of the demand in this direction partly due to the fact that you are bound to charge the same price as for lighting?

Witness: No; I do not know that it is. We have not any application whatever for variation in prices.

The clause was passed, together with the others relating to gas; some minor amendments having been made therein.

HALIFAX CORPORATION BILL.

Period of Error in Meter Registration.*

At the sittings of the Police and Sanitary Regulations Committee on Wednesday and Thursday—Mr. J. W. WILSON presiding—consideration was given to the above-named Bill, the object of which is to confer various powers on the Corporation of Halifax.

In the portion of the Bill relating to gas, one of the clauses stands as follows:—

In the event of any meter used by a consumer of gas being tested in manner provided by the Sale of Gas Act, 1859, and being proved to register

* The clause referred to is, of course, a common one in Gas Acts at the present day.

erroneously within the meaning of the said Act, such erroneous registration shall be deemed to have first arisen during the then last preceding quarter of the year, unless it be proved to have first arisen during the then current quarter. The amount of the allowance to be made to, or of the surcharge to be made upon, the consumer by the Corporation shall be paid by or to the Corporation to or by the consumer as the case may be, and shall be recoverable in like manner as gas-rents are recoverable by the Corporation.

The CHAIRMAN asked if there was any necessity for the clause.

Mr. COURTHOPE MUNROE, who appeared for the promoters, said he had better get the Town Clerk to answer the question.

Mr. *Keighley Walton* was then called, and, in reply to Mr. MUNROE, said the Corporation had a very large gas consumption in Halifax; and some such power as that which was asked for in the clause had been found to be necessary. The Magistrates would be very glad if the clause were inserted, as it would save a great deal of trouble, and get rid of a difficulty that had arisen.

The CHAIRMAN did not see the object of the clause.

Witness: Sometimes consumers claim for three years, and one man recently wanted to go back as far as six years. He thought it equitable, and that we ought to meet his claims.

Mr. CORRIE GRANT (a member of the Committee): On the ground that you had not discovered that the meter was defective?

Witness: Yes; or that he had not discovered it.

The clause was agreed to.

With reference to another clause, providing for consumers of gas supplied by the Corporation using, if required to do so, an anti-fluctuator and a silencer,

Witness said that the clause would only apply to persons who had factories and gas-engines. In practice he had found that it was wanted; several complaints having been received from people that they had been disturbed by the noise of gas-engines. There were a large number of these engines at work in Halifax, and it was hoped that there would be more.

The clause was passed.

Visit of the Smethwick Corporation to the Gas-Works.—The members of the Smethwick Town Council visited the gas-works last Thursday, and were afforded an opportunity, under the guidance of the Chairman of the Gas Committee (Alderman Pinkney) and the Gas Engineer (Mr. Vincent Hughes), of seeing them under every-day conditions. The object of the visit was chiefly to enable the Council to familiarize themselves with the extensions proposed to be carried out, and to enable them to better appreciate the necessity for the contemplated expenditure. It may be remembered that the duplication of the water-gas plant is one of the additions about to be made; while the provision of an elevated railway siding from the Soho line (London and North-Western Railway), which has been long-talked of, is now about to be realized. This necessitates the construction of a bridge across the Birmingham Canal, adjoining the works. The details of these projects, as well as the various processes employed in the manufacture of gas, were fully explained. At the close of the inspection, tea was served in the new meter-house, when, on the proposition of the Mayor (Alderman Bowden) the thanks of the visitors were accorded to Alderman Pinkney for his hospitality; and the valuable and courteous co-operation of Mr. Hughes was recognized.

Water-Works Extension at Brixham.—In view of the approaching completion of the new Paignton water-works, and the probability that the additional supply to be furnished to Brixham will be shortly available, the Brixham District Council have decided to proceed with the works required to enable them to make use of the new supply. These include a reservoir with a capacity of 300,000 gallons on Hill Head, Brixham, and works at Churston Ferrers in order to connect with the main from Paignton. The total cost is estimated at £7350; and application has been made to the Local Government Board for permission to borrow this sum. Mr. W. O. E. Meade-King, one of the Board's Inspectors, held an inquiry respecting the matter last Thursday. It was stated that the yield of the springs supplying the town was 114,960 gallons per day. An agreement had just been entered into with Paignton, under which Brixham was to be entitled, for a period of 50 years, to a maximum supply of 200,000 gallons per day. This, with the existing supply, would give 30 gallons per head for a population of 10,000; and it was estimated that the minimum supply under the agreement, which was for 75,000 gallons per day, would suffice for the needs of the present population for some years to come. Mr. Vanstone produced plans of the suggested works, and explained how it was proposed to carry them out.

Danger of Low-Flash Petroleum.—At the meeting of the Conservators of the River Thames on Monday last week, the Lower River Committee reported that they had received an application from the Anglo-American Oil Company, Limited, that ships carrying petroleum spirit might be allowed to discharge at the Company's wharf at Purfleet; and the Company expressed the opinion that the present method of discharging into barges at Thames Haven and bringing them up the river was attended with much greater risk than the discharge from vessels alongside their wharf. Having regard to the existence in the neighbourhood of Government magazines for explosives, the Committee had consulted the War Office, and had, in addition, obtained the views of His Majesty's Chief Inspector of Explosives on the subject generally, and had viewed the locality. They were advised that, subject to certain precautionary works being carried out, the discharge and storage of petroleum spirit at the Company's wharf might be allowed; but they were of opinion that the subject was of such importance as to demand the fullest investigation before any change was made. They therefore recommended that the correspondence and reports should be forwarded to the Board of Trade, with a suggestion that the Department should hold a public inquiry into the whole question of the conveyance and storage of low-test petroleum in the Port of London. After some discussion, it was decided that the application of the Company should be declined, and that the whole question of the conveyance and storage of low-flash petroleum on the river should be considered by the Committee.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Monday, April 10.

(*Before Mr. Justice* GRANTHAM.)

Graham, Morton, and Co., Limited v. Compagnie L'Union des Gaz—The Milan Gas-Works Contract.

In accordance with the arrangement come to on the 24th ult., and mentioned in the "JOURNAL" the following Tuesday, this case came on for hearing to-day.

Mr. RUFUS ISAACS, K.C., Mr. J. A. SIMON, and Mr. A. M. PADDON, appeared for the plaintiffs; Mr. J. A. HAMILTON, K.C., and Mr. A. H. SPOKES represented the defendants.

Mr. ISAACS said the case was originally set down to be heard before his Lordship and a Special Jury. But he and his learned friends had agreed that it would be quicker to take it without a Jury; and he therefore asked that they should be discharged.

Justice GRANTHAM: What is the point?

Mr. ISAACS: We are suing for the balance of a contract for work done, and there is a defence that certain guarantees have not been performed.

His Lordship assenting, the Jury were discharged.

THE PLAINTIFFS' CASE.

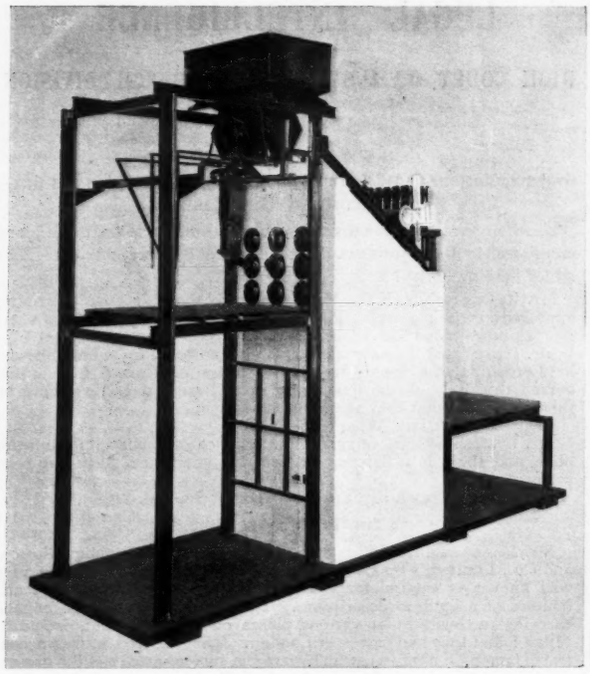
Mr. ISAACS said the action was brought by Messrs. Graham, Morton, and Co., Limited, who carried on business at Leeds, and were very well known as experts for the construction of gas installations and matters of a kindred description. The defendants were a Company carrying on business at various places on the Continent, including Milan; and they had offices in London. They entered into two contracts (among a number), which were the subject-matter of the present action. He proposed first to shortly indicate the points of the case, and then to go through the correspondence and the documents, which would contain a great deal of the evidence which it would be necessary to have before the Court.

Justice GRANTHAM: Your action is for money, and the defence is that the machines supplied did not do their work?

Mr. ISAACS said that was so. The first claim was for a sum no longer in dispute—some £1483, the balance of money due to the plaintiffs under certain contracts not the subject-matter of the action; and as to this there was no difficulty. The defendants at one time claimed to retain it and set up a counterclaim; but nothing turned on that, as it was admitted the money was due. But there was a sum of £4000 in respect to two contracts which were the subject-matter of the dispute; and substantially these contracts were similar—one being a repetition of the other. They were known as No. 1 and No. 6 contracts. They were made between the plaintiffs and the defendants; and they were for the construction and installation of gas plant; the price in the case of No. 1 contract being £39,328, and in the case of the No. 6 £38,328. These amounts were payable by the defendants to the plaintiffs. The contracts were for the construction of gas installations which he would refer to later in detail; but he would first indicate one particular point which ran through the case outside the technical details, and which depended on the view his Lordship took of the contract, and on certain facts which arose with regard to it. In the scheme of the contract, there were certain things which had to be provided for; and then there were guarantees entered into by the plaintiffs. He divided these into two parts for the purpose of convenience. One might be called a general, and the other a time, guarantee. By the latter he meant a guarantee as to the fitness of certain portions of the installation for a given time. As regarded the rest of the guarantee, the position was this: When the contract was completed, which it had to be by Sept. 30, 1902 (in fact, it was completed by Sept. 8), there was a provision that after a certain time had elapsed for what might be described as the drying of the construction, there had to be a test which was to last over a month. The object of this was obviously to get an average test, because, of course, adventitious circumstances might occur by which the installation would not work as well at one time as at another. In consequence of this, it was agreed that there should be a month's trial, in order that the work might be fairly tested; and at the end of that time, if the defendants were satisfied, there was to be an acceptance of the works, and then a very large sum had to be paid, leaving only a certain amount for retention-money, which was to be kept in hand to meet any breach of what he might call the time guarantee, which was quite apart from the other guarantees.

Justice GRANTHAM: Is it in reference to the retention money that the action is brought?

Mr. ISAACS said it was. During the time of the tests, difficulties arose because the defendants had agreed to supply Milan with gas under a very stringent contract, which made the concession subject to certain terms by which they lost it if the city was left for three days and three nights in darkness. There had been great labour troubles in Milan during 1900 and 1901, and the consequence was that the defendants were very anxious to do with as few workmen as possible. They wanted an installation with labour-saving appliances; and this the plaintiffs had supplied to them. This gave rise to a great many difficulties of a character similar to those experienced in this country. The workmen and their societies objected. There was scarcely anything that could be done that these men did not do to prevent the installation being successful. At the time the plaintiffs were carrying out the contract, they sent Mr. Leach, an engineer of reputation, who had charge; Mr. Jeffries, as Clerk of the Works; Mr. Davis, a superintendent mechanic; and 25 English bricklayers, each of whom had working under him several Italians. They also sent out from 16 to 20 English mechanics of high skill, receiving some £3 or £4 per week, as well as their board and lodging. It was perhaps not



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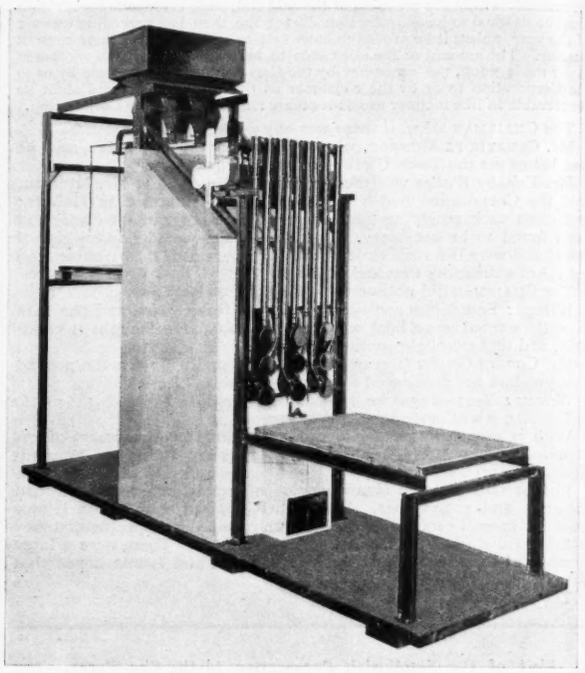


DRAWING STAGE.

wonderful that the Italian men did not like the situation. They did not like the English workmen being over them, or the labour-saving appliances either. So much was this the case, that the plaintiffs' workmen had to carry revolvers. At the end of October, some difficulties arose, and great pressure was put on the defendants to supply gas; and instead of working properly with a normal number of charges in the retorts of the installation, they worked them abnormally in order to meet the demand and safeguard their concession. Instead of four charges being put into the retorts in each 24 hours, they had five. This put a great deal more strain on the whole plant, as naturally it required much more heat for the furnaces, and he had no doubt this forced the installation unduly.

Justice GRANTHAM asked if there was nothing in the contract to prevent them putting in five charges?

Mr. ISAACS said there was not. As long as the machines were the property of the defendants, they could use them in any way they chose; but the complaint he made was that as this went on at the time of the testing, it was not a fair trial. They could not run for a month under these conditions, because obviously it would be absurd to look upon this as a fair test, as the one thing they looked at was the amount of fuel used in proportion to the bulk of coal carbonized. Therefore when they put in five charges instead of four they increased the consumption of fuel.

Justice GRANTHAM remarked that they got more gas.

Mr. ISAACS agreed, and said that, of course, this was what defendants wanted. But the quantity of gas produced had nothing to do with the plaintiffs. What the defendants wanted was gas; but there was no guarantee as to the amount, which depended on many things. Plaintiffs were under no guarantee as to the quantity of gas to be produced. The defendants would get more gas at greater expenditure of fuel; and instead of leaving the charges in six hours, they must withdraw them in five hours. There could be no doubt on this point; and he would call attention to some letters from the defendants' own Engineer which put that matter beyond question. He said it was not fair and not right to the plaintiffs. It was not a test which was of any value, because they were forcing the machines; and he suggested that they had better wait and have a test later on. The result was that the trial which had been begun was postponed. It was resumed again in November, 1902; but after it had been going on for 16 days, the defendants came to the conclusion that they were satisfied, and did not want any further test. This, of course, principally depended upon the fact that they did not want to go on for a month if they found the plant worked well for 12 or 14 days. The defendants then suggested that the further test should be put off till March, 1903, when, according to their view, it would be more satisfactory, because the weather would be better, and they would be under less pressure. Plaintiffs objected to this. They said they had constructed the installation and had been making the tests; and the defendants could not ask them to further postpone them. At last the plaintiffs agreed to leave £1000 more retention-money.

Justice GRANTHAM asked if plaintiffs agreed to let defendants have a test the following March.

Mr. ISAACS said that was exactly what they did not agree to. What they agreed to do was to leave them £1000 extra retention-money on each contract till the following March, so that they would have an opportunity of making their own tests and using the installation for these four or five months; and when it came to March, 1903, they would know what the position was.

Justice GRANTHAM: You agreed to this because, whether they made the test in March or all through the winter, it would agree with your test.

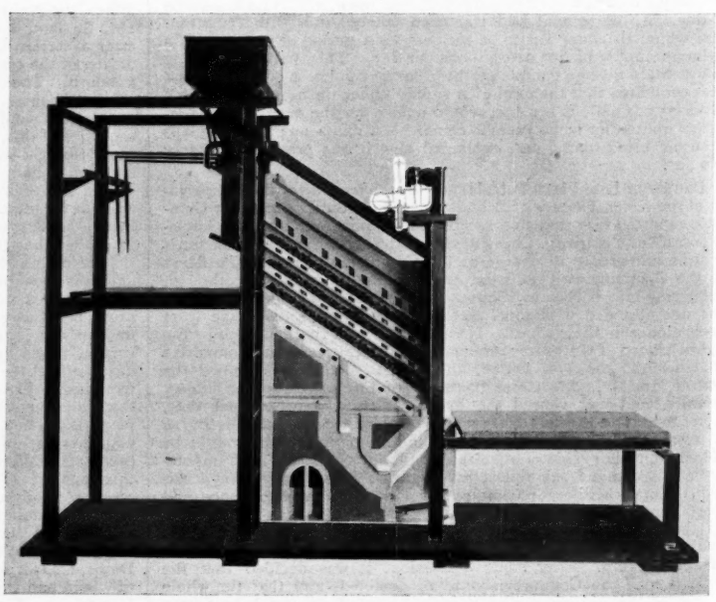
Mr. ISAACS: In one sense. But we were not bound to run a month's test. Their stipulation was that they wanted to keep a little money in hand. They said: "If we have got nothing to complain of at the end of March, 1903, apart altogether from the time guarantees, that will be all right. We shall know at the end of March whether or not we have a claim; and if we have not, we will give you the £1000 back."

Justice GRANTHAM: From your point of view, they were straining the machines during the whole of the winter.

Mr. ISAACS: Yes; but we allowed them to keep the £1000.

Justice GRANTHAM: When were the tests made?

Mr. ISAACS: The tests were to be made when the drying had been completed, and there were to be months for that. We heard no complaint up to the year 1903, and at that time they paid us £1000 on each contract without complaint or demur. They had run the machines for four or five months; and from December, 1902 (the date at which the parties arrived at an agreement to dispense with the continuance of



PRODUCER, &c.

the test for the full month) till December, 1903, the plaintiffs heard no complaint of any kind with regard to the work.

Justice GRANTHAM asked what the contract was with regard to the other retention-money.

Mr. ISAACS said it was to be paid at the end of two years; and it was made out in this way: The life of the retorts (the things his Lordship would see in the centre of a model placed on the jury-box)* was guaranteed by plaintiffs for 600 working days; and so a stipulation was made that £2000 should be left in respect of each contract for two years, to cover the time over which the retorts were guaranteed. This was what he called the time guarantee; and his case was that the machines were fully up to that guarantee. That was the state of things in December, 1903; and what he laid stress upon was that when once they had begun to run the machines——

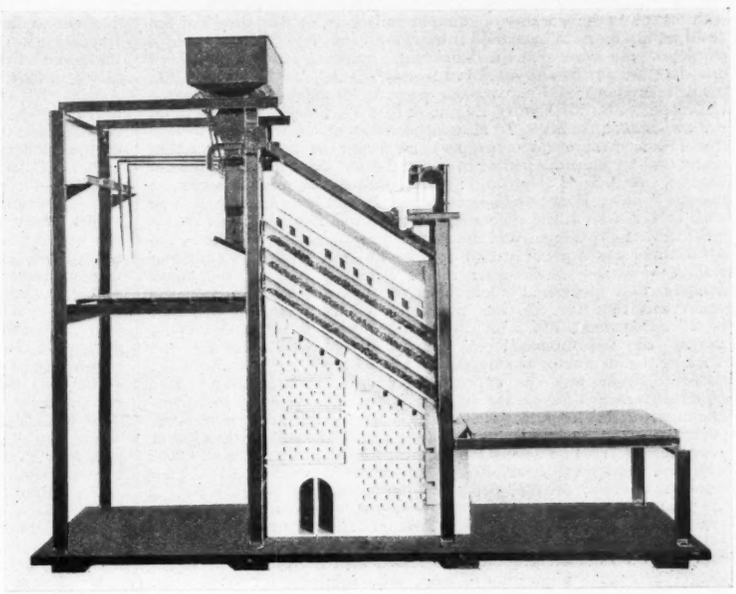
Justice GRANTHAM: When did the time begin to run?

Mr. ISAACS: From the time when the work was completed—before Sept. 30, 1902.

Justice GRANTHAM: That would make the two years expire in September, 1904.

Mr. SPOKES said as a fact it was Oct. 25, 1904.

Mr. ISAACS accepted this date. Continuing, he said this state of things went on right through 1903, and no question arose between the parties. He had not indicated the difficulties that did arise with regard to the men during the construction of the works and after the tests, because this would all appear in the correspondence. But they were really beyond question, because he had defendants' own Engineers and Managers pointing out the difficulties everyone was under in the matter, because all the people in Milan were prejudiced against these things, and wanted to stop their working. In some cases they removed parts of the machine; in others they would pour water in places where it was undesirable and even dangerous; the important point on which he laid stress, and which he submitted was a complete answer to everything except the time guarantee, was what took place after these difficulties had arisen. The defendants themselves raised a point that there was some trouble about heating. They said the parts did not heat sufficiently; the plaintiffs replied that this was because defendants' people did not stoke properly, and because they did not use proper coal and regulate the draughts. Defendants at first demurred; but eventually they seemed to come to the same conclusion. Therefore, as to the result, the defendants, having satisfied themselves that there was nothing wrong with the installation itself, but was what plaintiffs said it was, accepted it. The installation which plaintiffs had erected was substantially the same as they had put up in Edinburgh, which cost £110,000, and which he believed was the largest installation of inclined retorts in existence, and was certainly a model of what such works should be. Mr. Herring, the Engineer to the Edinburgh and Leith Gas Commissioners, had inspected the Milan works, and considered them a marvellous success.



SECONDARY AIR FLUE IN REGENERATOR.

COMPLAINTS OF THE INSTALLATION.

At the end of December, 1903, the defendants gave plaintiffs notice that they had complaints to make of the installation. Plaintiffs then saw their Manager and their Engineer (Mr. Bourne), and plaintiffs' reply was that Mr. Bourne was satisfied. Then in March, 1904, they asked for the amount due to them on the other contracts; and defendants said they were going to claim damages against them. One of the most extraordinary features in the case was the manner in which the defendants had dealt with this matter. In 1903, absolutely without the slightest notice to plaintiffs of any sort, Mr. Bourne had the idea that he would alter the construction of the furnaces. His Lordship would see from the model that there was a furnace to each bed of retorts; and each bed had nine retorts. Each bench had eight beds, so that there would be 72 retorts in each bench and eight furnaces. There were four benches in the two contracts and 32 furnaces in the whole installation, the subject-matter of the contract. Mr. Bourne, as he had said, set to work to alter the construction of the furnaces in a way he thought would be of benefit to the whole installation. This was in April, 1903, and, of course, if they had taken over the whole thing, they could do as they pleased with it.

Justice GRANTHAM: You say they had accepted it definitely at that time, and that is your case?

Mr. ISAACS: Yes, my Lord, subject, of course, to the time guarantee.

Justice GRANTHAM: This was in 1903, before your time limit was up?

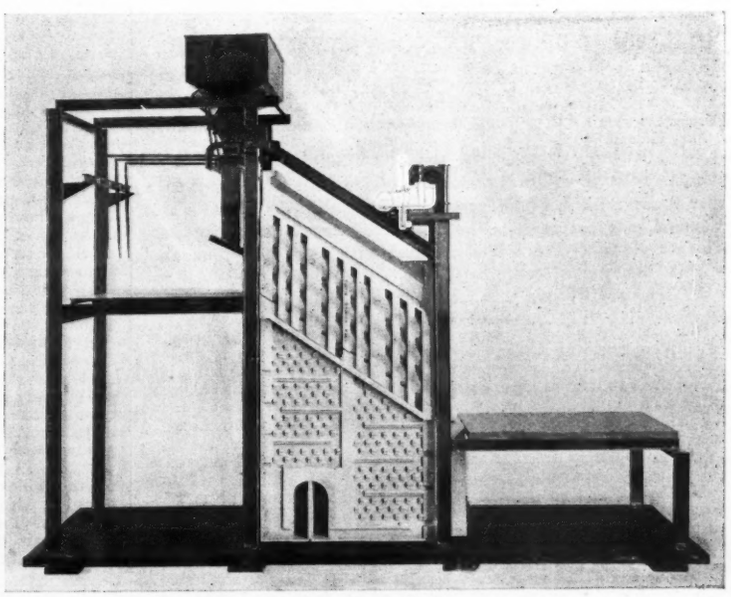
INTERFERENCE WITH THE BENCHES.

Mr. ISAACS said that was so. In April, 1903, Mr. Bourne had done this; and he actually went on using the installation with the altered furnaces without any intimation to the plaintiffs till March, 1904, when he gave them notice that he was going to claim damages. Plaintiffs did not even then know he had altered the furnaces. Then came a remarkable thing. Defendants gave notice to plaintiffs on the 30th of March that they were going to claim damages; and on the 4th of May they had actually set to work to demolish one of the four benches without any notice to the plaintiffs, and without their having any idea that the defendants were going to do anything of the kind. They actually demolished one of the benches with all its beds, and they subsequently did the same with the other three. So far as the plaintiffs could ascertain, the only ground for demolishing these installations was that there was some fluxing of the bricks and the materials in some of the passages, which made it difficult for them to get the necessary heat around the retorts. The whole explanation of this was that they were having recourse to direct firing, in consequence of the way in which they were using the furnaces. He need not go into detail on the matter, because his case was that when his Lordship had the correspondence before him, and particularly the defendants' own letters and the reports of their Engineers, his (Counsel's) submission would be that they were absolutely out of Court on the main question, and the only one which remained would be the trumpery one with regard to the time guarantee. Of course, in an action of this kind, apart altogether from the money involved, there was the suggestion that the plaintiffs were not capable of putting up such an installation as the one in question.

Mr. SPOKES: I do not say that at all.

THE CAUSE OF THE COMPLAINT.

Mr. ISAACS said at any rate the defendants said the design was not right. The plaintiffs said they were in the position to show that this Milan installation was exactly like the one in Edinburgh, and that Leeds was supplied in exactly the same way, and by the same people. He challenged his learned friend to show that there was any complaint



WASTE-GAS FLUES IN REGENERATOR.

* Some photographs are given of the model as produced in Court.

with regard to the working of these installations, or that they had not acted admirably. Why should it happen, if they had the same people employed, the same plans and drawings, material which was beyond question, and passed and approved by defendants' own Engineers, that the installations would not work properly? All material plaintiffs used was inspected by defendants' Engineers in this country. Why did it not work when set up in Milan? He supposed the only answer could be that it was because there was not proper control over the men at work in that place, and because the people in Milan did not want the thing to be a success. As one of them said: "Ah! that is the way the poor are ruined!" Mr. Bourne had not proper control over the men. The view of Mr. Green, the defendants' Consulting Engineer, was that a great deal of the difficulty in the matter was caused by this fact. No doubt there was a good deal of trouble in dealing with a number of Italian workmen, with their secret societies and all the other dangers that presented themselves with such people; but the result was that Mr. Bourne was not able to control them, and, as a consequence, the difficulties arose which brought about the fluxing of the material in the passages, which caused the blocking, and made the furnaces troublesome to work. This, in his opinion, was the explanation of the whole matter. One significant piece of evidence was this—that Mr. Naylor, the Superintendent of the Rochdale Road Gas-Works of the Manchester Corporation, who happened to be travelling in Milan in September, went over these works, and seeing the men demolishing the benches, asked why they were being pulled down. Someone informed him that they would not work; and he, being familiar with such things, ridiculed the idea, and pointed out that the only difficulty was caused by the passages being blocked up by the fluxing. At this time Mr. Naylor did not know of the legal proceedings; but when he heard that an action had been started, he communicated with the plaintiffs. Apart altogether from the question of who was responsible for the fluxing, the pulling down of works which had cost £80,000, and had only been in operation for 18 months, was a perfect scandal. When this was commenced, Mr. Bourne had ceased to be in the defendants' employ, having been pensioned off.

THE DEFENDANTS' CLAIM.

Defendants were entitled to do what they pleased with their own, but they must not do so at the expense of the plaintiffs, and, after having used the retorts for 18 months, make a claim for £70,000 by way of damages. Such a claim was a most preposterous one, and was calculated to do a business firm considerable injury. If the defendants were right in saying they had suffered damage, and in attributing it to plaintiffs, all they could recover was what it would have cost to put the works into a proper condition; and this would have been a comparatively small sum. One extraordinary feature of the case was this—that when the defence and the counterclaim were put in, there was an allegation that the work had been "provisionally accepted."

Mr. SPOKES said, in drawing the pleadings in this form, he meant that there had been a provisional acceptance "without prejudice," and not an acceptance within the terms of the contract.

Mr. ISAACS said he was willing that the word "provisional" should be struck out, and agreed that acceptance did not prevent the defendants from complaining of the time guarantee. The acceptance was one after the test, and dispensed with the full test. Although the defence was amended and re-amended, no alteration was made in this respect; and particulars were given that the "acceptance" was inferred from, and shown by, the letters; and from the fact that the defendants allowed the plaintiffs to withdraw their men and paid the purchase-money. Plaintiffs then amended their statement by claiming the £4000 retention-money; whereupon defendants obtained leave to amend by striking out the allegation as to acceptance. But plaintiffs claimed to be entitled to rely on what had been previously pleaded. Counsel then at some length referred to the terms of the contract and the correspondence which had passed between the parties, and had not concluded when the Court adjourned.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Wednesday, April 5.

(*Before the* LORD CHIEF JUSTICE *and Justices* KENNEDY *and* RIDLEY.)

Wilkinson v. Bury and District Joint Water Board.

This was an appeal from a decision of the Justices of Bury, on a special case; the question raised being the meaning of the words "annual rack-rent or value" in the Special Act of the respondents. The proceedings before the Justices were reported in the "JOURNAL" for the 9th of August last (p. 403).

Mr. HORACE AVORY, K.C., and Mr. BIRON appeared for the appellant; Mr. LANGDON, K.C., represented the respondents.

Mr. AVORY said this was a test case; the appellant being the owner of three cottages in Knowle Street, Radcliffe, which were let by him to weekly tenants, he paying the rates. The respondents claimed to assess the appellant at the gross sums received by him from the tenants, while he contended that he could only be assessed on the net amount he had after deducting the rates. Among these, as set out in the case, the water-rate itself was included.

The LORD CHIEF JUSTICE expressed a doubt whether, in any case, this could be deducted.

Mr. AVORY said he thought it could; but he need not discuss the point, as it had been allowed by the respondents. But the appellant further claimed to deduct the amounts paid for poor-rate and general district-rate. He also thought he would be entitled to make a deduction for repairs; but this again was not followed up. The respondents having claimed 19s. 9d. for the three cottages in question for the quarter ending June, 1904, on the gross value, the appellant tendered 17s. 8d., which was refused. The appellant then lodged a complaint before two Justices to have the question determined. When the matter came before them, respondents submitted that they had no jurisdiction, on the ground that the section of the Water-Works Clauses Act of 1847 giving jurisdiction was inconsistent with the clause in the Bury District Act of 1903, and was therefore not incorporated. The Justices held that this objection was valid; but in case their view was not correct, they decided that the respondents were right in assessing the water-rate on the full sum received by the owner.

Mr. LANGDON remarked that the respondents desired to have a decision of the case on the merits, and did not insist on their objection to the jurisdiction.

Mr. AVORY said that the whole question turned on the meaning of the words "annual rack-rent or value," which he urged were interchangeable, and meant the same thing. He submitted that the case was governed by *Sheffield Water-Works Company v. Bennett*, and *Stevens v. Barnet District Gas and Water Company*,* in which the words of the Special Act were almost identical with those in this Act.

Mr. LANGDON contended that the question before the Court must be decided on the words of the Special Act itself, and that cases cited on other statutes could only have an indirect bearing upon it. He suggested that the governing words here were "rack-rent" and that they implied the total amount received by the landlord under that name. This view was supported by section 35 of the same Act, where the word "rent" also appeared, and where it could only mean the amount paid by the occupier, because it empowered him in certain cases to pay the water-rate and deduct it from the rent due by him to the landlord. Although not stated in the case, he was instructed that the water-rate had for thirty or forty years been assessed on the gross annual rent; and this was the first time it had been questioned.

The LORD CHIEF JUSTICE said the Court could only go by what appeared on the case.

Mr. LANGDON agreed that it was entirely a question of the construction of the statute. He commented at some length on the Sheffield case, which he thought was the only one really applicable, and submitted that it was not conclusive.

The LORD CHIEF JUSTICE, in giving judgment, said it was impossible to maintain the position for which Mr. Langdon contended. The words "annual rack-rent or value" were evidently intended to have but one meaning, and that was the fair value. In Bennett's case, it was held that the words "annual value" entitled the consumer to deduct the rates; and unless Mr. Langdon could make out that the words were used in a different sense here, this was a binding authority. In the case of *Bristol Water-Works Company v. Uren*,† the same words, "annual rack-rent or value," meant the same as "gross estimated rental," which entitled the rates to be deducted. The appeal must therefore be allowed.

Lords Justices KENNEDY and RIDLEY concurred.

The appeal was allowed with costs; the order being that the right amount to be charged was 17s. 8d., and not 19s. 9d.

THE RIVINGTON ARBITRATION AWARD.

Mr. Lever's Action Against the Liverpool Corporation.

In the King's Bench Division of the High Court of Justice on Thursday and Friday last week, Mr. Justice Warrington had before him the action brought by Mr. William Hesketh Lever, of Thornton Hough, Cheshire, and of Port Sunlight, against the Corporation of Liverpool, to enforce specific performance in the case of an award made in consequence of a notice to treat given by the defendants to the plaintiff for the compulsory acquisition of about 1850 acres of land belonging to him at Rivington, Lancashire, under the powers conferred upon them by the Liverpool Corporation Act, 1902.

The circumstances giving rise to the action will be in the recollection of most of our readers who are interested in matters relating to water supply. The plaintiff, it may be remembered, paid £72,000 for the Rivington Estate, and spent considerable sums of money upon it—building a bungalow for himself and making roads and developing the upper part of the property. Under the above-named Act, the defendants were empowered to acquire compulsorily certain portions of the plaintiff's land for the purposes of their water undertaking; and on Nov. 17, 1903, they served him with notice to treat. For the land they required they offered him £40,000; but he claimed £450,000. Arbitration proceedings then took place, to ascertain the amount defendants should pay; and Sir Edward Boyle, Bart., K.C., was appointed to act for the plaintiff, and Mr. Robert Vigers for the defendants. No Umpire having been appointed by them, the Board of Trade nominated Mr. R. E. Middleton, M.Inst.C.E., who was an Assistant-Commissioner on the Metropolitan Water Inquiry in 1892-3. The evidence as to value was adduced on July 11, 1904, and was heard, by consent of the parties, before the Umpire and the Arbitrators sitting together. After the hearing, the Umpire went to Rivington, accompanied by an agent for each of the parties, and made a further inspection of the property, and while there was taken ill, thus causing some further delay. But eventually, on Nov. 2, 1904, he published his award, under which he decided that the amount of purchase-money and compensation to be paid to the plaintiff was £138,449, in addition to certain easements and other rights specified in an undertaking given by the defendants to the plaintiff. As the defendants had declined to act on this award and proceed with the completion of the purchase, the plaintiff commenced the action claiming specific performance of the agreement constituted by the notice to treat and the award, payment of the amount so awarded, with interest at 4 per cent., and payment of his costs of and incidental to the arbitration and the award.

The main defence to the action was that the Umpire had made a mistake, and that he was suffering from mental incapacity at the time

* See "JOURNAL," Vol. XXI., p. 569, and Vol. LI., pp. 782, 877.

† *Ibid.*, Vol. XLV., pp. 586, 633.

he made his award. The allegation in the statement of defence on this point was that in July, 1904, when he went to Rivington, before he could complete his further inspection of the property or make the necessary notes and calculations, he became seriously ill, and suffered from great exhaustion and nervous breakdown, accompanied by loss of memory; and that this illness continued up to and including the date of the award. The defendants alleged that the state of the Umpire's health was such that his mental vigour was impaired, that he was incapable of dealing with the questions he had to consider, and consequently unable to make an award. They also submitted that the award was in excess of the jurisdiction of the Umpire, and conceived and drawn up in error as to the nature and extent of his authority, and particularly as to a right claimed by the plaintiff to divert and sell water from the watershed forming part of the lands in question. They claimed that the award ought to be set aside on these and some other grounds.

Mr. Asquith, K.C., M.P., Mr. Horridge, K.C., Mr. Preston, and Mr. Raymond Asquith appeared for the plaintiff; Mr. Balfour Browne, K.C., Mr. H. Terrell, K.C., and Mr. F. E. Smith represented the defendants; and Mr. R. J. Parker held a watching brief on behalf of Mr. Middleton.

Mr. Asquith having opened the case, and fully dealt with the circumstances, Mr. Terrell said that all the points the learned Counsel had brought forward were admitted by the defendants except the award of £138,449. Mr. Asquith said he failed to see what dispute there could be about the award. He would, however, refer to the defendants' pleadings, as he was anxious to know what issue they were there to try. He then proceeded to do this, and in due course came to the paragraph in which they contended that the state of the Umpire's health was such that his mental vigour was impaired, and that he was incapable of dealing with the questions before him, and consequently unable to make an award. Mr. Terrell was understood to say that the defendants would rely upon this plea. Mr. Asquith said he would produce irresistible evidence that there was not a scintilla of foundation for the charge that the Umpire was not fit to make the award. The defendants had full knowledge of his condition, and extended the time for making the award. After referring to the other points in the defence, the learned Counsel said this was the plaintiff's case.

Mr. Terrell then opened the case for the defendants. Having given a history of the Rivington undertaking, he dwelt at some length upon the legal question of the jurisdiction of the Umpire, and contended that it was limited to assessing the amount of compensation to be paid. He said he proposed to call the Umpire, as the case was one of great magnitude, and he did not want it to be said that he did not tender evidence which he might have offered. He was entitled to know whether, in the estimate of the compensation, he had taken into consideration any matter not within his jurisdiction. Mr. Asquith remarked that there was no question of law, but purely one of fact. Mr. Terrell next passed on to deal with the alleged incapacity of the Umpire to make his award, and finally called Mr. Middleton and examined him as to the state of his health in the autumn of 1904. Witness said he was attacked on the 27th of July, but the illness in no way affected his memory or clearness of judgment; and he went for a sea voyage. He took into consideration in his award all the points raised before him. In answer to Mr. Asquith, he said there was not the slightest pretence for saying that when he made the award he was not in a fit mental condition to do it. Dr. T. R. Glyn, of Liverpool, was also called, and said he was asked by the Corporation to visit Mr. Middleton, who was suffering from nervous breakdown, but there were no brain or mental symptoms. Thereupon his Lordship asked Mr. Terrell whether, after this evidence, he thought he could continue this part of the defence. Mr. Terrell replied that he could not—it was quite hopeless. There only remained, therefore, the question that the award was bad on the face of it, and in excess of the Umpire's jurisdiction.

In giving judgment, his Lordship reviewed the case in detail. Coming to the question of the health of the Umpire, and his consequent incompetency to make his award, he remarked that, after the evidence that had been given on this point, all he could say was that he was surprised a body like the Liverpool Corporation should have put such a plea on record. In his opinion there was not a particle of evidence to support it, and it wholly failed. After dealing at some length with the argument as to the jurisdiction of the Umpire to entertain all the matters referred to him, his Lordship came to the conclusion that this part of the defence also failed, and that the award was valid. He, therefore, made the usual order for specific performance as sought by the plaintiff, and also directed the defendants to pay Mr. Lever's costs in the arbitration and in the action.

Assault on a Gas-Fitter.

At the Newport Borough Police Court, on Monday last week, Herbert J. Lloyd, licensee of the Three Salmons Inn, was summoned for assaulting Francis Charles, a foreman gas-fitter in the employ of the Newport Gas Company. Mr. Charles Lloyd appeared to prosecute; Mr. J. H. Jones defended the accused. It seems that defendant had paid £3 on his gas account, but £1 13s. 11d. was owing. Because this had not been paid, complainant went on the 21st of March to the inn to disconnect the meter. Defendant said if Charles waited half-an-hour he would find the money. He waited two hours; and as he failed to get any answer, he went into the cellar and began to cut off the meter. Defendant came down, and said that if he did not clear out he would throw him out. Thereupon a struggle ensued, in the course of which defendant picked up a shovel and threatened to kill the complainant. Eventually police assistance was obtained. Defendant said he had not seen Charles before, and when he found him in the cellar he ordered him out; whereupon complainant called him a dirty dog. As Charles looked as if he would strike him, witness picked up a small fire shovel to protect himself. Mr. Jones argued that the defendant only used conditional threats, as he wanted to get Charles out of the house, and it was his duty to have taken the money when it was offered. The Bench fined defendant 20s. or 14 days.

MISCELLANEOUS NEWS.

DEVONPORT AND THE WATER-GAS QUESTION.

The Carburetted System Adopted.

The Devonport Town Council last Tuesday took up the adjourned discussion on the question of installing water-gas plant at their works. The facts of the case were fully set forth in the issues of the "JOURNAL" for March 14 (p. 718) and March 28 (p. 861). The Gas Committee, by a vote of the majority, recommended that the tender of Messrs. S. Cutler and Sons of £4875 for carburetted water-gas plant should be accepted. The minority were in favour of the recommendation of the Consulting Engineers (Messrs. Stevenson and Burstal) and the Corporation Gas Engineer (Mr. Sidney E. Stevenson) that "blue" water gas should be adopted. At the last meeting, Mr. Tozer moved, as an amendment to the Gas Committee's report, that the acceptance of Messrs. Cutler and Sons' tender be deferred for twelve months.

Mr. J. H. BISHOP, resuming the discussion on the amendment, said that since he was appointed a member of the Gas Committee, in November, 1903, he had taken more than an ordinary interest in the undertaking. From the beginning he had been struck by the enormous outlay on capital account, and the great number of contracts which came before every meeting of the Committee. He found a firm of Consulting Engineers appointed at a commission of 5 per cent., and that the chief partner of the firm happened to be a brother of the local Resident Engineer. To his mind, such an affinity as that was not conducive to the public good. The Engineers were instructed to bring up a report on the new works required; and they estimated that an outlay was necessary. Before the Committee thoroughly understood their business, no less than £40,000 of work was contracted for. The cost for purifiers at Plymouth was 30s. per foot, but at Devonport it was 45s.—a difference of something like £2000—and even then the plant had not been handed over in a satisfactory condition. Hitherto the Committee had listened to the advice of the Engineers; and £40,000 had been spent on plant which was unproductive. With regard to the immediate question of whether they should adopt carburetted or blue water gas, when he found that in 230 of the largest works of the country carburetted water gas was adopted, and that there had been only eight paltry installations of "blue" water gas, he questioned the advice of their Consulting Engineers in favour of the latter system. It was to be regretted that in this matter, which was of vital importance to Devonport, they were divided by party politics.

Mr. C. M. BARTLETT protested against the decision of the question being deferred for twelve months. He said he was unhesitatingly in favour of carburetted water gas. It was undesirable to defer the matter, because they were working at full pressure in order to supply the town with gas. They were told by the Engineers that carburetted water gas was a nuisance; but consumers in Plymouth, from whom he had made inquiries, did not confirm this opinion.

Other members having spoken in favour of the Committee's recommendation,

Alderman W. HORNBROOK, the Chairman of the Gas Committee, said the apparent intention of the opponents of carburetted water gas was that the matter should be adjourned again and again; and he therefore proposed to move that the question be put and a vote taken. All the evidence was in favour of carburetted water gas rather than "blue" water gas. The question was one which ought to be determined without delay, for they were in danger of the retorts giving out at any time.

Mr. W. GEORGE said that, including the cost of the land, they had spent £58,000 on extensions and alterations at the works; and not a cubic foot more gas could be produced than before all this outlay. The further expenditure now proposed would complete the scheme, which without it would be useless. There would then be a saving of 8d. per 1000 cubic feet of gas.

Mr. P. PALMER contended that it was wrong to talk of spending so much money while there was such friction between the Chairman of the Gas Committee and the Engineer. The matter should be referred back, in order that they might settle their differences.

Mr. R. H. RENDLE said he was not in favour of either the motion or the amendment, and whichever was carried he should move another amendment. He could not vote for the present amendment, because he thought it unbusinesslike to hang up the question for twelve months. They ought to face it and settle it, or take steps which would result in its being settled. As a representative of the ward in which the gas-works were situated, he protested against anything being placed there which would cause a nuisance.

Alderman W. LITTLETON said he wished to support the amendment that further capital expenditure be delayed. Out of £100,000 authorized, they had spent £58,000; and they had still to spend £6000 on the holder, £2000 on the tank, and £3000 in commission. Altogether they were committed to an expenditure of £69,000. They did not know whether they would have to face litigation. If the Engineers were not to be trusted, who were they to trust in the future? No doubt the Chairman had done his best; but if anything happened, who were they to make responsible? He wished the Council would allow the Engineer to tell them the position in which they stood, or permit another expert Engineer to come and address them.

The discussion on the amendment was then closured and put to the vote, with the result that there were: For the amendment, 17; against, 32; neutral, 3. The amendment was therefore lost.

Mr. RENDLE moved as another amendment—"That a Committee consisting of seven members of the Council, not being members of the Gas Committee, be appointed to consider the question of the improvements now being carried out at the gas-works, in accordance with Messrs. Stevenson and Burstal's report dated July 16, 1902, including the water-gas plant, and to take such action thereon as they may deem expedient, and to report to the Council fully thereon." He said the tone of

the discussion led to the inevitable conclusion that they wanted more light on the question. They needed to be guided by someone who had the ability to give them advice.

Alderman W. J. Waycott remarked that he had intended to move a similar amendment; but he would second this, though he thought words should be added authorizing the proposed Special Committee to engage an independent engineer to assist them with his advice. He had no desire to cast any reflections upon the Consulting Engineers, the Engineer, the Chairman of the Committee, or anyone else; but having regard to the differences which existed upon the question, and to the necessity of protecting their interests as a Council, it seemed to him that the course proposed by the amendment would be the best to pursue. There was no desire that the Special Committee should have anything to do with the general management of the works. His idea was that they should go into the question of the expenditure already incurred, and advise the Council whether to adopt water gas or to extend the coal-gas plant.

Mr. H. Banbury asked who were the seven members of the Council, who knew nothing of the management of the gas-works, who were to overhaul the work of the Gas Committee. He was opposed, under the circumstances, to any amendment which would shut out the Gas Committee.

Mr. A. Stroud contended that the only way in which they could benefit by the present expenditure was by the recontruction of the retort-house. This ought to have been done in the first instance.

Alderman Hornbrook contended that no seven members of the Council were qualified to sit in judgment on the work to which the Gas Committee had devoted two years and more. It was an insult to propose such a thing; and if carried, it would be a vote of want of confidence in the Committee.

Mr. C. Goodman said that, as a member of the Gas Committee, he advocated the appointment of the Special Committee to advise the Council in their dilemma. Evidence would be brought before the Committee such as they never dreamt existed. So long as they went on as they were going, they were wasting money. He should like the Special Committee to be appointed, and notice to be given to the Gas Committee to appear before them.

The second amendment for the appointment of a Special Committee was negatived; 20 being in its favour, 32 against, and 1 neutral. The resolution for the confirmation of the minutes was then carried.

Alderman Littleton at once gave notice to move at the next meeting of the Council—"That the resolution accepting the tender of Messrs. Cutler and Sons be rescinded, and that it be an instruction to the Town Clerk not to sign any contract or tender on behalf of the Corporation until that meeting has been held."

Resignation of the Gas Engineer.

The Gas Committee of the Devonport Corporation held a meeting on Saturday, at which Mr. Sidney E. Stevenson tendered his resignation of the position of Engineer and Manager, which he has held since the Corporation acquired the works. The resignation will be reported to the Town Council on Thursday next, when the monthly meeting of that body will be held. Mr. Stevenson was appointed over four years ago, and was in the service of the old Company at the time the works were taken over.

In response to a requisition numerously signed, the Mayor has convened a public meeting for to-day to consider the present condition of the municipal gas undertaking, and to pass such resolutions as may be considered necessary.

Correspondence.

Correspondence is published in the local papers which has passed between Sir Joseph Bellamy and Mr. Stroud, a member of the Devonport Town Council. Mr. Stroud said, in a speech on the water-gas question, that the carburetted water gas at the Plymouth Gas-Works was a nuisance, and that the Company had had to purchase some of the surrounding property. Sir Joseph characterized this statement as incorrect and libellous, and explained that the manufacture of water gas at Plymouth creates no nuisance, and that no property has been acquired having reference to any possible nuisance arising therefrom. Mr. Stroud thereupon withdrew the statement, and expressed regret for having made it.

Messrs. Stevenson and Burstal, the Consulting Engineers, in a letter published in the local papers, point out that in January, 1903, they advised the Council to proceed immediately with the remainder of the works, and pointed out that the whole of the profits of a gas undertaking are made in the retort-house. They said that, with the present condition of things, there was a loss of 6d. or 7d. (if not 8d.) per 1000 cubic feet, because of the bad state of the works. From that time, they had never received instructions to prepare the drawings and specifications for the necessary contracts. How, therefore, they can be held responsible for the present state of the undertaking, passes their comprehension. Had they received instructions immediately after the confirmation by the Council in January, 1903, of the report of the Gas Committee recommending that the scheme be proceeded with, the work of manufacture would have been very nearly (if not entirely) completed by now.

NOTTINGHAM CORPORATION GAS SUPPLY.

The Closing of the Radford Works.

At the Meeting of the Nottingham City Council on Monday last week, the Town Clerk read a petition which had been signed by a large number of ratepayers and gas consumers residing in the Radford district, requesting the Gas Committee to reconsider their decision to close the works at Radford. It was pointed out that gas had been made at these works for a great number of years, and it would be an injustice to the ratepayers of the district, and to the men employed, to close them. The petition was referred to the Gas Committee. In connection with this subject, Mr. Cook asked the Chairman of the Gas Committee if it was true that the works were still capable of producing 11 million cubic feet of gas per week, and if so why they were closed. Mr. E. Harlow replied that the works were capable of such an output, and the reason they were closed was, shortly, that the cost in wages there worked out at 5s. 9d. per ton against 3s. 10d. per ton at Basford. In addition to this serious loss, the cost of coal and the other expenses were greater in proportion.

At a later period of the meeting, Mr. E. Harlow brought forward the Committee's report concerning the additional plant required at the Basford works. It set forth that the completion of the extension begun in 1901 was now necessary owing to the increase in the consumption of gas to 10½ million cubic feet a day. The estimated cost of the whole extension was £18,000. He moved the passing of the first reading of the report, and said it was rather unfortunate that on the Committee bringing it forward the works at Radford had been closed, because the natural conclusion drawn was that this was part and parcel of what was meant to be effected by the report. When the closing was decided upon, it was on the ground of the excessive cost of production of gas there as compared with the other works. It should be remembered that as not so much gas was required in summer as in winter, it became necessary to close some of the works; and the choice had fallen on those at Radford. The same thing had occurred in 1900, in 1901, and in 1902; and if it were not done, a loss would accrue to the ratepayers of £50 a week in wages. Representations had been made to him that the first reading of the report should be deferred for a month because of the petitions from the workpeople and tradesmen of the Radford district; and a deputation on the matter was to be received by the Committee that afternoon. Nevertheless, he was prepared to state the case according to the report. There were manifest indications that the report was not viewed favourably by the Council; and when Dr. Fraser suggested that Mr. Harlow would be well advised to take it back, on the ground that the information was much too meagre to enable the Council to come to a decision, there were unmistakable signs of approval. Eventually, by consent, the report was withdrawn.

PRICE OF GAS IN MANCHESTER.

The Contribution to the Rates.

At last week's Meeting of the Manchester City Council, the Chairman of the Gas Committee (Alderman Gibson) moved that as and from June 24 next the price of gas be reduced by 1d. per 1000 cubic feet—namely, from 2s. 4d. to 2s. 3d. within the city, and from 2s. 7d. to 2s. 6d. outside—to all ordinary consumers, including public lamps. The conclusion of the Committee, he said, had been arrived at because of applications they had received from several large firms for a reduction for what they called business purposes. If, however, the Committee favoured these large consumers, they must admit everybody to the same reduction. It would be impossible to define the term "business purposes." The reduction would mean a sum of £17,000. The Gas Committee were not in the prosperous position they had been in for some years. The consumption of gas had not increased during the past year to any appreciable extent. The price had been down to 2s. 3d. before; but at that time a charge was made for meter hire. The abolition of this charge represented the taking out of the gas profits of something like £24,000 a year, which practically meant that the price of gas was now reduced to 2s. 1d. per 1000 cubic feet. Mr. Smethurst said it was unusual to bring forward a resolution of this kind except in connection with the presentation of the estimates of the Committee; and the Council ought to know before they passed the estimates what sort of year the Gas Committee had had, and what the prospects were for the ensuing twelve months. Last year the Committee contributed £60,000 in relief of the rates. It was a debatable question whether this was a right principle; but for many years they had received these contributions, and they wanted to know whether they might rely upon the same amount in the future. The matter, he suggested, might be postponed for a month. Alderman Gibson said that two years ago the contribution from the Committee in relief of the rates was £50,000. To prevent an increase in the rates, the sum was advanced in the following year to £70,000; and last year the contribution was £60,000. For the ensuing year, the Committee proposed to give £50,000. The reduction in the cost of street lighting would mean a saving to the rates of another £2000. A contribution at the rate of £1000 a week was as much as the Council had a reasonable right to ask. He could not take the matter back.

It was ultimately resolved that further discussion of the question should be deferred till the next meeting of the Council.

PROPOSED GAS-WORKS FOR WITHNELL.

A Local Government Board inquiry has lately been held by Mr. H. P. Boulnois into an application by the Withnell Urban District Council for a Provisional Order enabling them to undertake works of gas supply for the district. Mr. Isaac Carr, the Consulting Engineer to the scheme, explained that the proposed site for the works was the natural one, as it was at the lowest level of the district, and conveniently adjoining the Leeds and Liverpool Canal—the site being below that of the canal, and suitable for works of construction. All requisite coal and other material required would come by the canal; and the tar, ammoniacal liquor, and coke would be removed by the same means. The scheme was laid down for a production of 50,000 cubic feet per day, or 10 millions per annum; and provision was made for doubling or trebling the capacity. Attention had also been given in laying down the scheme to the employment of the whole of the site in the event of the subsequent growth of the district requiring it. He said he was of opinion that the introduction of a supply of gas to the district would prove a source of profit to the Council, and a convenience to the community which would doubtless be greatly appreciated. He was not aware of any place of the size and importance

of Withnell that was without gas. The area of supply was to extend to Withnell Fold, Abbey Village, Withnell Mill, and Brinscall. The estimated annual consumption was 7 million cubic feet, and the number of consumers 569, of which 460 were at Withnell Mill and Brinscall, 50 at Withnell Fold, and 48 at Abbey Village. Five shillings per 1000 feet was suggested as the maximum price in the Order; but it was confidently anticipated that the actual rate charged to consumers would be considerably below this figure. The estimated total outlay was £10,000, of which £1400 was for building, £2000 for plant, £2957 for mains, and £2192 for service-pipes, fittings, &c.

The Clerk (Mr. J. W. Carter) explained that the Chorley Corporation had, under their Act of 1871, the right to supply Wheelton, and part of this township was in 1899 added to Withnell; but Chorley had never supplied that portion, and were quite willing to forego their rights if the Withnell Council proceeded with their scheme. There were in the district a number of private firms actually supplying gas, not only for their own works, but in some instances to cottages; and the Council would like the power to purchase these mains where thought advisable. On behalf of the Lancashire and Yorkshire and London and North-Western Railway Companies, it was stated that there were, in the 2 miles of railway in Withnell, seven bridges and a level crossing; and special provisions regarding the length of notice before breaking up roads, &c., were asked for—fourteen days' notice being named. The Inspector, however, said he did not think it likely that the Local Government Board would insert anything overriding the Gas-Works Clauses Act. It was pointed out that the suggested clause had been inserted in various Corporation Bills. Mr. Carter proposed an arbitration clause, and said they did not want to come in conflict with anybody. Similar protection was asked for by the Manchester Corporation with regard to their Thirlmere aqueduct. Mr. Blackstock pointed out that, under section 153 of the Public Health Act, the Withnell Council were entitled to alter the position of the Manchester Corporation works, and this was another reason why they asked for protection. The undertakers could also open tunnels; and the Corporation considered that as their line of pipe passed under the roads of the district, their cut-and-cover might be tunnelled, and they were afraid of cracks appearing and offensive matter percolating through. There was a mile of cut-and-cover in the district. The Corporation had laid down two lines of pipes, and were now considering the question of laying a third. The General Act only provided for three days' notice in respect to works carried out by gas undertakings; and he suggested that it should be fourteen days. In other Bills they had had fourteen days' notice inserted. Mr. Carr remarked that they would only cross the aqueduct once.

PUBLIC LIGHTING IN WESTMINSTER.

Competition of Gas and Electricity.

At the Meeting of the Westminster City Council last Thursday, the Works Committee reported that, consequent upon the resolution come to by the Council to terminate, as from the 9th of November next, the existing contract with the St. James's and Pall Mall Electric Light Company, Limited, they had received an offer from the Company to continue their contract for five years from Jan. 1, 1905, at the reduced price of £20 per lamp per annum; being £10 per lamp per annum less than the existing contract. Before considering this offer, however, the Committee instructed the City Engineer (Mr. J. W. Bradley, M.Inst.C.E.) to obtain a tender from the Gaslight and Coke Company for lighting the streets in question. A specification was thereupon prepared by him for the provision and maintenance of about 66 lamps, each giving a minimum illuminating power of 700 candles. It was pointed out in clause 14 of the specification that the existing pillars and lamps were the property of the Council, and could be used by the successful tenderer. The Engineer invited tenders for the work in accordance with his specification, and received the following tenders: Gaslight and Coke Company per lamp: Installation, £10; maintenance and lighting, £15 1s., subject to an increase or decrease of 9s. 6d. for every 1d. per 1000 cubic feet increase or decrease in the price of gas for public lighting, which is now 2s. 2d. per 1000 cubic feet. Kitson Light Foreign Supply Company (oil light): Installation, not using existing pillars and lamps, £35 10s.; using them, £15 10s.; maintenance and lighting, £14. St. James's and Pall Mall Electric Light Company: Maintenance and lighting, £17. The Committee did not think it advisable to adopt oil lighting, and therefore confined their consideration to the tenders of the Gas and Electric Light Companies. Under the existing contract, the Council pay £30 per lamp per annum for the maintenance and lighting of the lamps, or a total of £1980 per annum. If the Council accepted the tender of the Electric Company, which, the Committee pointed out, was a reduction upon their offer of the 20th of December last of £3 per lamp, the total annual cost of maintenance and lighting would be £1122 per annum, or £858 less than at present. The Gas Company's tender for maintenance and lighting worked out at £993 per annum, or £987 per annum less than at present. The acceptance of their tender would involve an expenditure of £10 per lamp for installation; but the Company were prepared to take payment of this charge in five annual instalments, free of interest. The Committee further reported that they had received a petition, signed by 55 ratepayers in Regent Street and Piccadilly, with reference to the Council's proposal to terminate the contract with the Electric Light Company, and expressing the opinion that a change in the present method of lighting these thoroughfares would be a retrograde movement. The Committee deemed it advisable that the use of electric light for these streets should be continued, and therefore they recommended that the tender of the Electric Light Company should be accepted; that a contract, terminating on Nov. 9, 1910, be entered into accordingly; and that the petitioners be informed of the steps proposed to be taken by the Council in the matter.

In reply to questions, the Chairman of the Committee (Mr. Spencer Smith) said that, taking into consideration the cost of installation, the Gas Company's tender was £17 1s. per lamp per annum, and that of the Electric Company £17—a difference in favour of the latter of 1s. The Committee, he thought, had been influenced by the representations in the petition received. A member remarked that the petitioners evidently did not understand the possibilities of compressed gas. Alderman Emden said the Council were paying thousands of pounds a year for electric light, while equally good illumination could be had much cheaper from gas. He urged that the recommendation be reconsiderd. Mr. Spencer Smith said he should like to add to his previous answer, as to the relative cost of the two systems of lighting, that while gas would be 1s. a lamp per annum dearer, after five years, when the cost of the installation was paid off, it would be much cheaper. Alderman Emden said the electric light was never seen in fogs. After some further discussion, Mr. Spencer Smith said that personally he favoured gas, on account of its greater reliability. The meeting of the Committee at which the matter was decided was not largely attended, and he was perfectly willing to take the recommendation back for further consideration. This was agreed to *nem. con.*

The Lighting of Parliament Square.

The following report from the Works Committee on the lighting of Parliament Square was received and adopted by Council. "We have received a letter from the Gaslight and Coke Company, calling attention to the fact that the sum of £650 has been provided in the Civil Service Estimates for improving the lighting of Parliament Street, Parliament Square, and the west front of the Houses of Parliament, and stating that, under the circumstances, they assume that the scheme for a high-pressure gas lighting system, for which the Council have accepted their tender, will not be proceeded with. The scheme referred to by the Company was adopted by the Council on July 14, 1904; but as H.M. Office of Works, by an old arrangement, undertake the lighting of the square at the cost of the Council, the Council gave them notice to terminate the arrangement. In October, 1904, the Board wrote requesting the Council to await a further communication from them, as they were considering a scheme for introducing incandescent lighting to the precincts of the Houses of Parliament generally; and the Committee gave instructions for the progress of the Council's scheme to be delayed accordingly. No reply having been received on Jan. 4, 1905, the Board were asked if they had arrived at a decision, as the Council were desirous of proceeding with the improved lighting of Parliament Square; and on Jan. 21, the Board stated in reply that they hoped to be in a position shortly to furnish the Council with particulars. By the Committee's direction, a further letter was addressed to the Board on Feb. 7, expressing the desire of the Committee to carry out the improved lighting before the reassembling of Parliament, and asking for a definite reply at their early convenience. We understand that attention has been called to the indifferent lighting of Parliament Square, and that the Council wrongly receive the discredit which attaches to the delay in improving it. We submit the facts of the case to the Council for their information."

THE LIGHTING OF LIVERPOOL.

The annual report of Mr. C. R. Bellamy, Assoc.M.Inst.C.E., the City Lighting Engineer, contains on the present occasion, as usual, much interesting information as to the public lighting of Liverpool.

During last year, the city was lighted by 18,360 public lamps. Of these, 14,081 were street-lamps—13,874 gas and 207 electric—the remainder (of which 50 were electric) being situated in courts, passages, and conveniences. In 1893, the year prior to the lighting being taken over from the Gas Company by the Corporation, there were 272½ miles of streets lighted by a total of 11,122 public lamps of an aggregate illuminating power of 771 million candles; the maintenance charges being £40,881. Last year, there were 441¼ miles of streets lighted; the aggregate illuminating power of the 18,360 lamps being 3273 million candles, and the maintenance charges £47,648. It will thus be seen that, while 168¾ miles of street lighting have been added since 1893 (increasing the number of lamps by 65 per cent.), and the aggregate illuminating power more than quadrupled, the charges are only 16 per cent. greater. These figures, of course, refer to the extended city; but a more direct comparison can be secured by taking those relating to the old city, which was the area lighted in 1893. Last year within this limit there were 273¾ miles of streets lighted by 13,111 lamps of an aggregate illuminating power of 2406 million candles; the maintenance charges being £35,267. When compared with the figures already given for the earlier period, it will be seen that, while one mile of street lighting has been added, with 1989 additional lamps, and the total illuminating power more than trebled, the charge has fallen by £5614, or 13 per cent. It should be mentioned that nearly the whole of the street gas lamps are on the incandescent system; those in passages, &c., being mostly flat-flames.

Turning to the work carried out during the past year, Mr. Bellamy says that the fitting with lights of passages over 15 yards in length throughout the extended city was completed. In 1896, it was decided to light half the number of passages in the old city; and this was done by 1898. In 1901, it was determined to complete the work, fitting with one lamp each passage in the extended city not already lighted. Owing, however, he says, to delay on the part of the Gas Company in providing the necessary gas supply, this work was not completed until May last; 69 lamps having been connected during the year. In accordance with the instructions of the Committee, three double and 93 single incandescent gas-lamps were fixed in lieu of flat-flame burner lamps during the year, at a first cost of £166 7s. 4d., increasing the annual charges by £16 8s. 5d. The lighting of 5 miles of new streets was carried out by the erection of five double and 161 single incandescent and one ordinary flat-flame burner gas-lamps. The lighting of 1⅝ miles of road was re-arranged during the year, involving the erection of 32 new lamps, and the removal of 41 existing lamps to fresh positions. The total roads lighted at the end of the year (irrespective of passages and courts) amounted to 441¼ miles; 4½ miles being lighted by electricity, 426¾ miles by incandescent gas, and the remaining 10½ miles—principally back streets—by the ordinary flat-flame system.

The number of gas-meters tested last year was 6337 (of which 675

were rejected); this being an increase of 20 per cent. over the preceding twelve months, due to the Gas Company's larger deliveries. The fees amounted to £253, or an increase of 12 per cent. With regard to electricity meters, 2981 were tested, and 1089 rejected; thus showing that 36 per cent. of the number submitted were incorrect. The fees amounted to £124, which was a slight reduction.

The statutory illuminating power of the gas is 20 candles; and the average of 319 tests at the Corporation office in Hood Street was 20·97 candles. The average of 109 tests made over the district at the various establishments of the Corporation by means of the Dibdin portable photometer was 20·93 candles. With regard to calorific power, 316 tests were made at Hood Street; the result being to show an average of 709·77 British thermal units per cubic foot of gas gross.

The total charges in connection with the public lighting of the city and the supervision of the gas supply for the year amounted to £52,596; and a revenue of £3736 was derived from work charged to other departments and bodies, which included a large portion of the general gas-fitting work of the Corporation. This made a net expenditure of £48,859, which would be covered by a rate of 3½d. in the pound, as compared with 4d. in 1894.

METROPOLITAN WATER BOARD.

First Annual Report.

The First Annual Report of the Metropolitan Water Board—presented to the Local Government Board in compliance with section 28 of the Metropolis Water Act, 1902—was issued last Friday. By an arrangement come to between the two bodies, the period to be covered by the annual reports is to March 31. It is remarked in the opening paragraph that this arrangement will doubtless prove convenient; but it nevertheless somewhat limits the contents of the present report, inasmuch as, at the end of the first financial year (March 31, 1904), the Board had not come into possession of the water undertakings, nor had the compensation to be paid to the Water Companies on their transfer been definitely ascertained. However, by delaying the issue of the report, and using foot-notes and appendices, it has been possible to include information subsequent to the financial year it covers, so as to afford a general account of the transfer and of the settlement of the compensation consequent thereon. The report, which is signed by the Clerk (Mr. A. B. Pilling), furnishes the following particulars in regard to the formation and early work of the Board.

The Metropolitan Water Board was established under the Metropolis Water Act, 1902, for the purpose of acquiring by purchase, and of managing and carrying on, the undertakings of the Metropolitan Water Companies and the water undertakings of the urban districts of Tottenham and Enfield. There were, however, certain exceptions from the transfer. The Act provides that parts of the boroughs of Croydon and Richmond, and of the urban districts of Cheshunt and Ware, shall cease to be within the limits of supply transferred to the Board, and that the powers, rights, and duties of the Councils of those boroughs and districts with respect to the supply of water shall extend throughout their respective areas.

In the case of the New River Company, the Act reserves to them their landed estate, houses, and property not directly used for, or connected with, their water supply, and also such part of the offices and furniture in Rosebery Avenue as may be required for their purposes after the transfer. The Company, however, make the suggestion that the Board should purchase the reserved portion of the Rosebery Avenue offices; and as it was clear that such a settlement would be advantageous, terms were arranged under which the Board acquire the whole of this valuable property instead of leaving a central part of its frontage outstanding in the hands of another owner. The sum payable to the Company under this arrangement is £9500, and includes the transfer to the Board of the celebrated carved oak panelling and furniture, which have attained a high degree of antiquarian value.

The Act prescribes the area in which the Board may supply water. It consists of the parishes and places in which the Metropolitan Water Companies were authorized to supply it, with the addition of the parishes of Sunbury and Chessington, but subject to the exceptions already mentioned in favour of the boroughs of Richmond and Croydon and the urban districts of Cheshunt and Ware. The parishes and places thus included in the limits of supply, and a description of the intakes, wells, springs, pumping-stations, reservoirs, and filter-beds taken over with each of the undertakings, are fully set out in appendices to the report.

The next subject dealt with is the constitution of the Board. As our readers are no doubt aware, it is a body corporate, consisting of 66 members appointed by the authorities set forth in section 1 of the Act. During the period covered by the report questions arose with respect to some of the provisions of the Third Schedule to the Act, which contains regulations as to the appointment and tenure of office of members of the Board. The questions chiefly related to the filling of casual vacancies arising out of the circumstance that certain members of the Board did not, at the municipal elections, retain their seats on the bodies by whom they were appointed to the Board, with the result that at the end of two months they would vacate their seats on the Board unless they were in the meantime re-elected to their appointing bodies. The matter was submitted to Counsel, who advised the Board in the terms set out in the report.

The first meeting of the Board was held in the Council Chamber of the Privy Council on April 2, 1903, in pursuance of an order of the Local Government Board dated March 12, 1903. Ordinary meetings are held on alternate Fridays in the Board-room of the Metropolitan Asylums Board, which has with much courtesy been placed at the disposal of the Board for that purpose. For the more convenient discharge of the detail of their duties, the Board appointed Standing Committees, who meet fortnightly, or oftener when required, and present reports and recommendations to the meetings of the Board. At the first meeting of the Board, Sir J. T. Ritchie, one of the representatives of the City of London, was elected temporary Chairman, and held that office until a meeting on April 30, 1903, when Mr. (now Sir) R. Melvill Beachcroft was appointed Chairman, and in the ordinary course of events will retain this office until the first meeting of the Board after June 1, 1907. The appointment of a Vice-Chairman was postponed; and this office had not been filled on March 31, 1904. Mr. John Glass was, however, appointed on the 29th of April.

In view of the pending transfer of the officers and servants of the Water Companies, the Board were not called upon to appoint an extensive staff; but two important appointments were made to the offices of Clerk of the Board and Accountant. At their first meeting, the Board appointed Mr. Aubrey V. Symonds, of the Local Government

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 91.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
500,000	10	Oct. 13	10½	Alliance & Dublin 10 p.c.	21⅛—22⅛	+⅛	4 13 4
160,000	10	,,	7½	Do. 7 p.c.	14⅜—15½	..	4 16 9
200,000	5	Nov. 11	6½	Bombay, Ltd.. . . .	6¾—7¼	+¼	4 9 8
140,000	5	,,	6½	Do. New, £4 paid	5—5⅛	+¼	4 14 6
50,000	10	Mch. 15	14	Bourne- mouth Gas and Water } 10 p.c. . . Pref. 6 p.c.	29⅜—30½	..	4 11 10
251,810	10	,,	7		16⅜—17½	..	4 0 0
53,200	10	,,	6		15⅛—16½	..	3 12 9
380,000	Stk.	Feb. 24	12	Brentford Consolidated	247—252	..	4 15 3
300,000	,,	,,	9	Do. New . . .	185—190	..	4 14 9
50,000	,,	,,	5	Do. 5 p.c. Pref. .	127—132	..	3 15 9
206,250	,,	Dec. 15	4	Do. 4 p.c. Deb. .	105—108	..	3 14 1
220,000	Stk.	Mch. 15	11	Brighton & Hove Orig.	223—228	..	4 16 6
246,320	,,	,,	8	Do. A. Ord. Stk. .	165—170	..	4 14 2
460,000	20	Mch. 30	10	British	40⅛—41½*	..	4 16 5
100,000	Stk.	Feb. 24	6	Bromley, Ord. 5 p.c. .	118—123	..	4 17 7
165,700	,,	,,	4½	Do. do. 3½ p.c. .	90—94	..	4 15 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	12⅛—13	..	5 7 8
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	96—98	+1	4 1 8
150,000	20	Mch. 15	8½	Cagliari, Ltd.	25—27	..	6 2 3
100,000	10	Sept. 29	10	Cape Town & Dis., Ltd.	17⅛—17¾	+⅛	5 12 8
100,000	10	Oct. 27	4½	Do. 4½ p c Pref.. .	9⅞—10⅛	..	4 7 10
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,400,000	Stk.	Feb. 24	5 5/16	Commercial 4 p.c Stk. .	116—119	..	4 7 4
560,000	,,	,,	5	Do. 3½ p.c. do. .	112—115	..	4 6 11
450,000	,,	Dec. 15	3	Do. 3 p.c. Deb. Stk.	86—88	..	3 8 2
800,000	Stk.	,,	6¼	Continental Union, Ltd.	111—114	−2	5 14 0
200,000	,,	,,	7	Do. 7 p c Pref.	140—145	..	4 16 7
424,070	Stk.	Feb. 18	5½	Derby Con. Stk. . . .	—	..	—
55,000	,,	Jan. 3	4	Do. Deb. Stk. . . .	108—110	..	3 12 9
486,690	10	Jan. 27	11	European, Ltd. . . .	22—23	+⅛	4 15 8
354,060	10	,,	11	Do. £7 10s. paid	15—16	+⅛	5 3 2
15,243,200	Stk.	Feb. 10	4 1/16	Gas- light and Coke } 4 p.c. Ord. . . 3½ p.c. max. . . 4 p.c. Con. Pref. 3 p.c. Con. Deb.	97⅛—98⅛	−⅛	4 9 4
2,600,000	,,	,,	3½		92—94	..	3 14 6
3,799,735	,,	,,	4		112—114	..	3 10 2
4,193,975	,,	Dec. 15	3		90—92	..	3 5 3
258,740	Stk.	Mch. 15	5	Hastings & St. L. 3½ p.c.	100—103	..	4 17 1
70,000	10	Sept. 29	11	Hongkong & China, Ltd.	16⅛—17⅛	..	6 5 9
3,800,000	Stk,	Nov. 11	10	Imperial Continental .	218—221	..	4 10 6
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,212	Stk.	Mch. 15	6	Lea Bridge Ord. 5 p.c. .	118—123	..	4 17 7
561,000	Stk.	Feb. 24	10	Liverpool United A . .	221—223	..	4 9 8
718,100	,,	,,	7	Do do. B .	162⅜—164⅜	..	4 5 1
306,083	Stk.	Dec. 30	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	Dec. 15	5	Malta & Medn., Ltd. .	4—4⅛	..	5 11 1
560,000	100	Apl. 1	5	Met. of } 5 p.c. Deb..	101—103*	..	4 17 1
250,000	100	,,	4½	Melbourne } 4½ p.c. Deb.	101—103*	..	4 17 1
541,920	20	Nov. 11	3½	Monte Video, Ltd. . .	11¼—12½	+⅛	5 12 0
1,565,892	Stk.	Feb. 24	4½	Newc'tle & G'tesh'd Con.	107—108	..	4 5 8
406,025	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	92—93	..	3 15 3
15,000	10	Feb. 24	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	10	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	Nov. 30	8	Oriental, Ltd. . . .	148—151	..	5 6 0
600,000	5	Mch. 30	7	Ottoman, Ltd. . .	6—6⅛*	..	5 12 0
235,005	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6†	Primitiva Ord. . . .	6—6⅛	..	4 12 4
796,980	5	Jan. 27	5	Do. 5 p.c. Pref. .	4¾—5¼	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
851,070	10	Oct. 13	7	River Plate Ord. . . .	13—13½	..	5 3 8
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	97—99	+1	4 0 10
250,000	10	Sept. 15	7†	San Paulo, Ltd. . . .	13—13⅜	..	5 3 8
70,000	50	Jan. 3	5	Do. 5 p.c. Deb. .	52—54	..	4 12 7
135,000	Stk.	Mar. 15	10	Sheffield A	234—236	..	4 4 9
209,984	,,	,,	10	Do. B	234—236	..	4 4 9
523,498	,,	,,	10	Do. C	233—235	..	4 5 1
123,998	Stk.	Mch. 30	5	Shrewsbury Ord. 5 p.c.	102—105*	..	4 15 3
70,000	10	,,	11	South African	16—17	..	6 9 5
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	128—130	−1	4 4 7
1,832,700	,,	Jan. 13	3	Do. 3 p.c. Deb.	89—91	..	3 5 11
575,000	Stk.	Feb. 24	5½	S'th Suburb'n Ord. 5 p.c.	120—123	..	4 9 5
60,000	,,	,,	5	Do. 5 p.c. Pref. . .	122—127	..	3 18 9
112,533	,,	Jan. 3	5	Do. 5 p.c. Deb. Stk.	130—135	..	3 14 1
502,310	Stk.	Nov. 11	5	Southampton Ord. . .	107—110	..	4 10 11
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Feb. 24	6¼	Tottenham } A 5 p.c. .	125—128	..	4 17 8
338,020	,,	,,	4⅛	and } B 3½ p.c. .	97—100	..	4 15 0
125,000	,,	Dec. 15	4	Edmonton } 4 p.c. Deb.	107—110	..	3 12 9
182,380	10	,,	8	Tuscan, Ltd.	9⅛—10½	..	7 16 1
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Feb. 24	7⅛	Wands- worth and } A 5 p.c. . B 3½ p.c. . C 3½ p.c. .	163—168	..	4 12 3
255,636	,,	,,	6⅛		135—140	..	4 9 3
60,000	,,	,,	5 5/16		111—113	..	4 16 0
57,564	,,	Dec 30	3	Putney } 3 p.c. Deb. Stk.	82—87	..	3 9 0
745,872	,,	Mch. 15	5	West Ham 5 p.c. Ord.	102—104	..	4 16 2
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	123—126	..	3 19 4
193,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—110	..	3 12 9

Prices marked * are Ex div. † Next dividend will be at this rate.

Board, to act temporarily as Clerk; but subsequently they appointed Mr. Albert Bamford Pilling, the Town Clerk of Devonport, and the Solicitor to the Corporation of that town. On Nov. 27, 1903, they decided to appoint an Accountant; and Mr. F. E. Harris, the Treasurer and Accountant of West Ham, was on Jan. 22, 1904, selected to fill the office. On May 8, 1903, the Bank of England were appointed bankers to the Board, on the understanding that at a later date separate accounts for working purposes might be opened at other banks. It was also resolved that, for the present, the Chief Cashier of the Bank of England should be the Treasurer of the Board.

Pending the ultimate decision at which the Board might arrive with regard to the provision of offices, temporary accommodation was provided for the staff and for meetings of the Committees at Caxton Hall, Westminster. In August, 1904, they removed to more commodious premises in Savoy Court, Strand. The Board decided early that all goods should be supplied to them by competitive tender, and that the contractors employed should pay such rates of wages and observe such hours of labour as are generally accepted as fair in their trade. In order to carry on their work, advances were obtained from time to time from the Bank of England; and on March 31, 1904, they amounted to £145,000. On March 18, 1904, the Finance Committee recommended that, subject to satisfactory arrangements being made with the Bank of England, the Bank should be asked to undertake the issue of the Board's stock. On the consideration of this recommendation, the Committee were instructed to report as to the terms upon which the Bank would do this; but time did not permit these terms to be definitely stated before the expiration of the period covered by the report.

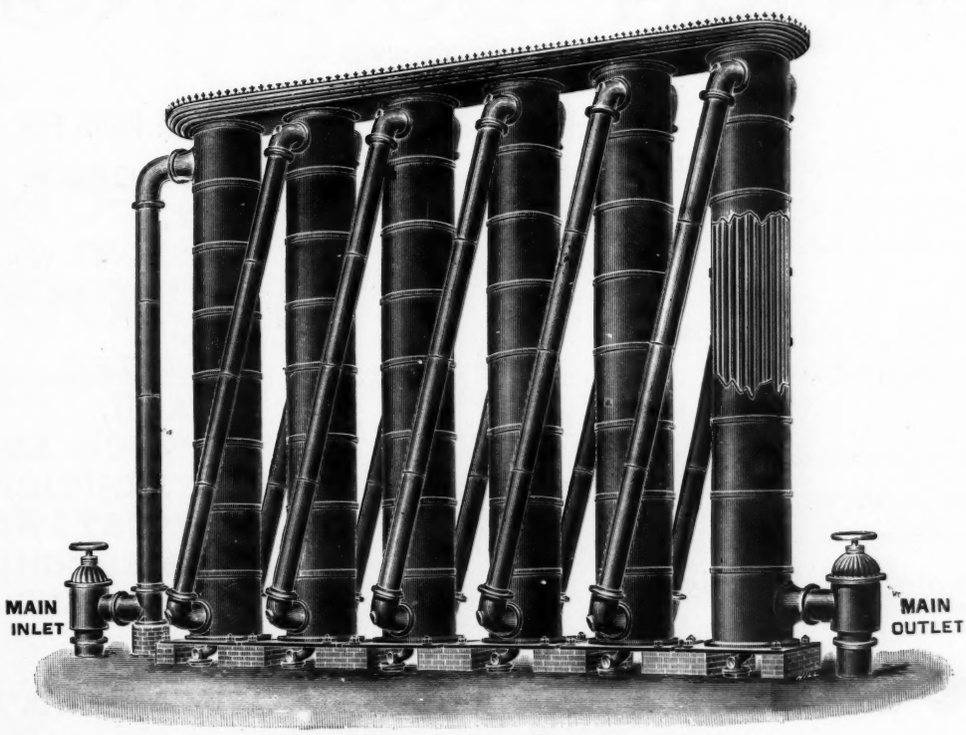
The examination of the Bills and Provisional Orders promoted during the session 1904 engaged the attention of the Law and Parliamentary Committee; and the Board authorized the Committee to seal and deposit petitions against such Bills as might appear to prejudicially affect the Board's interests. On Feb. 19, 1904, the Committee reported to the Board that they had had under consideration a large number of Bills and Orders; that with respect to some of these measures it did not appear that the interests of the water undertakings would be injuriously affected; but that in other cases it was thought to be expedient that protective provisions should be sought. The Committee came to the conclusion that it was the duty of the Water Companies to take such steps for the protection of the undertakings as they would have taken had the Act of 1902 not been passed. In order to avoid any misapprehension concerning the attitude of the Board, the Committee caused this view to be communicated to the Companies, who met the Committee's views with much courtesy, and furnished a statement of the steps they proposed to take. The result was that the Committee only thought it necessary to deposit a petition on behalf of the Board in the case of the Barnet District Gas and Water Bill, by which the promoters sought power to sink a well and construct a pumping-station at Little Berkhampstead in the rural district of Hertford.

The Board next explain what they have done in connection with the examination of the water they supply and the continuation of the rainfall records, and then pass on to the subject of the arbitrations. The Act of 1902 constituted a Court of Arbitration, consisting of the Right Hon. Sir Edward Fry, Sir Hugh Owen, G.C.B., and Sir John Wolfe-Barry, K.C.B., to determine the amount of compensation to be paid to the Companies and to the Tottenham and Enfield District Councils, as well as certain matters connected with the water supply of Croydon, Richmond, Cheshunt, and Ware. The Court were required to commence their sittings within nine months after the passing of the Act, and to proceed with the arbitrations so as to make, as far as possible, all their awards before June 24, 1904, the day appointed for the transfer. The expenses of the Court were to be paid by the Board. The inquiry proceeded in due course, and the principal statistical features with respect to each Company are given in appendices to the report. The total capital issued on the appointed day was £11,624,948. The total claims amounted to £49,145,164, and the sum awarded in cash was £30,662,323. In the case of Croydon, the Board claimed £255,000 for the portion of their undertaking transferred; the Corporation offered £190,000, and the Court awarded £225,810. In the case of Richmond, the Board arrived at an agreement by which the Corporation were to pay £35,000 in respect of the transfer; and the Board are to supply the Corporation with water in bulk. The Tottenham District Council claimed £103,452, and the Enfield Council £77,750; but they eventually came to terms with the Board for £79,150 and £72,854. As regards Cheshunt and Ware, there were no water-works or plant falling within the definition of section 12 of the Act, and the supplies formerly given by the New River Company amounted to only ten in number. Under these circumstances, the Board decided not to make any claim against the two District Councils concerned.

As our readers are aware, some important legal questions arose in the course of the arbitrations. They related to the payment of back-dividends and the operation of the sinking fund and sterilization clauses of the Companies' Acts. The first came up in connection with the case of *Lamplough v. Kent Water-Works Company*, which the House of Lords decided in favour of the Board. Differences of the utmost moment occurred between the Board and the Companies concerning the true application of the above-named clauses, and the Arbitrators devoted special attention to them as common issues. Their judgment was in favour of the Board; and in view of the general interest taken in these two questions, Sir Edward Fry's words are given *in extenso* in an appendix. The Companies obtained leave to appeal against these decisions; and in due course the case was brought before the Court of Appeal; and the Court, after hearing Counsel for the Companies, but without calling on those who appeared for the Board, disallowed the appeals, with costs. Subsequently an appeal of the Companies against the judgment with reference to the sinking fund clause was dismissed by the House of Lords, with costs. During the consideration of the case of the New River Company, several points of law arose in respect of which the parties asked the Arbitrators to state a case for the Court of Appeal. This Sir Edward Fry did. They related to the limitation of dividend, the excepted estates of the Company, back-dividends, and the payment

CONDENSERS.

WATER COOLING.



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of the land-tax. The question of back-dividends was governed by the judgment in the Lamplough case already referred to; and on the remaining three questions the Court of Appeal decided in favour of the Company, but gave leave to the Board to appeal to the House of Lords, who subsequently gave judgment in favour of the Board on all these questions.

There are seven appendices to the report. The first shows the parishes and places in which, on June 24, 1904, the Companies were authorized to supply water, together with the parishes of Sunbury and Chessington; the second gives a list of the works of the Companies and of the Tottenham and Enfield District Councils; the third is the important statement made in the course of the arbitrations by Sir Edward Fry as to the quality of London water; the fourth consists of tables showing the income, expenditure, and profit of the Companies per 1000 gallons; the succeeding two are those containing the particulars as to the capital and the awards to which reference is made in the report; and the last is the text of the judgment of the Court of Arbitration on the questions of the sinking fund and sterilization clauses.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Informal Meeting of Gas Managers in Glasgow this week was an unqualified success. It was greatly to be regretted that the state of Mr. M'Gilchrist's health prevented him from being present to see the vigour of the meeting which he founded twenty-two years ago, and which he has done so much to foster. Last year, when the meeting attained its majority, he was appropriately made President, and both worthily and generously discharged that office. While his absence was to be regretted, it is highly probable that it did not operate as a drawback to this year's meeting, because there were not a few present who were unaware that he had been laid aside by sickness; and so it may be taken for granted that the full attendance on Thursday was, in part at least, due to a lively remembrance of past glories, in which he had a leading part. The address of the President this year —Mr. J. Napier Myers, of Saltcoats—was of a philosophic nature, pitched in a spirit of cheerfulness; and it led to a worthy discussion. It was a self-contained address, and so was the discussion it created, by which I mean that the whole of the topics that were dwelt upon related alone to the best interests of the gas industry. Mr. Myers fell foul of the prepayment gas-meter; but, after his explanation of his position, it may be conceded that in this matter his bark is worse than his bite. The feeling of the meeting was distinctly against him. His view as to the change in the range of error in meters will receive more attention. But in whose interest was he speaking? It could not be that of the meter makers, because the necessity of producing more perfect apparatus would lay an additional burden upon them. Again, were a narrower margin of inexactitude allowed, it would most probably follow that consumers would take advantage of it; and unless they did, there would be no good purpose served in granting them the power to do so. This would lead to increased cost in the testing of meters, and to increased friction with consumers. It is probable that if the Sales of Gas Act were being enacted now, the margin would be made more strict; but as there does not appear to be any general complaint about the present arrangement—which Mr. Macfie described as a fair arrangement for settling disputes—it is not very probable that Mr. Myers's suggestion, ingenious though it is, will be acted upon, but rather that the disposition will be to let well alone.

It was mentioned at the Informal Meeting in Glasgow on Wednesday that Mr. J. M'Gilchrist, of Dumbarton, has been ill. For some considerable time he has been in a very poor state of health, but now, thanks to a vigorous constitution, and to careful nursing, he is, I am happy to learn, almost his former self again.

At a meeting of the Inverness Town Council on Monday, Mr. R. L. Mackintosh moved that it be remitted to the Finance Committee to consider and report as to the desirability of transferring the free surplus at the credit of the Gas Department from revenue to capital, with the view of its being expended on the laying of new gas-mains in districts where the demand for gas is increasing so much that the old mains are unable to supply it. He stated that there had been a piling up of the profits in the Gas Department to the extent of £12,000. Treasurer Birnie, who seconded, said the amount of the surplus was not so great as Mr. Mackintosh had said; a large proportion of it having been used as capital already. After some discussion, the motion was adopted.

The Cleaning and Lighting Committee of the Edinburgh Town Council had under consideration on Monday the question of the gas supply of the city. A Sub-Committee had recommended that the Council should obtain expert advice on the respective qualities of the gas lighting and electric lighting in the city. The full Committee approved of this being done; and the recommendation will come before the Town Council in due course. The Committee instructed the Town Clerk to write to the Gas Commission inquiring if they were prepared to enter into a contract with the city for a term of years for the supply of gas for lighting purposes, including stair lighting. He was also instructed to ask at what price the Commissioners would supply gas for that purpose—for two and three cubic feet per hour incandescent lamps. In regard to this point, the opinion was expressed that the gas should be supplied to the Corporation at cost price.

As the information is certain to get into circulation, it may be as well to state openly that the Committee of the North British Association of Gas Managers have again under consideration the question of affiliation with the Institution of Gas Engineers. They had it before them at a meeting about a month ago, and again on Wednesday in Glasgow. One of the arguments in support of the proposal to affiliate is that the Association stand alone in not having affiliated, and that they are, by their action in keeping themselves singular, not only losing any benefits which may be flowing from affiliation, but are crippling the general body by not lending assistance. The Committee have, as yet, done nothing in the matter, but have continued consideration of it till the

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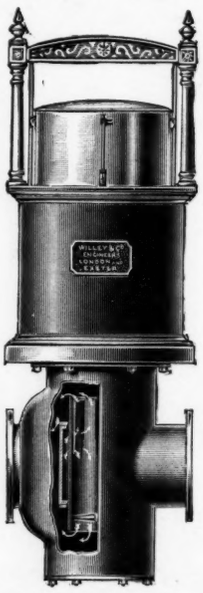

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GOSPORT (3),
ILFRACOMBE,
LOOE,
MAESTEG,
NEATH,
NEWTON ABBOT,
PLYMOUTH (2),
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annual meeting of the Association, which is to be held in St. Andrews in July.

The dismissal of workmen from the Dundee Corporation Gas-Works formed a subject of discussion in the Town Council of that city on Thursday. The Gas Committee had a few days before resolved that the action of the Manager in dismissing men for whom there was no longer work was correct. In the Council it was asked that the subject should be taken back by the Committee for further consideration. On behalf of two of the men, it was stated that they had had 21 and 15 years' service respectively, and that men with shorter service had been kept on. On the other side it was claimed that the men who had been kept on were best suited for the work; and it was pleaded that if the Council were to interfere between the Manager and his men, they would render the Manager impotent. The Council did not listen to this common-sense argument, but sent the subject back to the Committee, giving instructions, at the same time, that the whole Council should be called to the meeting at which it is to be brought up.

The annual meeting of the Campsie Gas Company was held on Tuesday. Applications for the position of Manager of the Company were considered; and it was agreed to appoint Mr. R. A. Napier, of Shotts, to the post. The usual dividend of 10 per cent. was declared.

On Monday evening, in the Town Council of Newport (Fife), Bailie Carswell introduced the subject of the size of the gas bills which were being presented to consumers. He said he had received many complaints on the subject, and that the opinion held by some was that too much gas was being driven through the pipes. He suggested that a statement might be prepared, giving the consumption of gas in a given area upon corresponding days of two years, and that, from this, the Council might arrive at some understanding of any great dissimilarity in the amounts, if such existed. Personally he saw no foundation for such complaints, and he knew that his colleagues generally were of opinion that there was no fault to find. Bailie Robertson, the Convener of the Gas Committee, repudiated the suggestion that the pressure of the gas was too high; and Bailie Carswell, in view of the fact that it would be difficult to arrive at any very helpful statement, withdrew his suggestion.

The water supply of St. Andrews is considered to be not altogether satisfactory. This came out at a meeting of the Town Council on Monday, at which Provost Murray moved a motion proposing to give authority to the Water Committee to procure an additional supply. He estimated the cost at £6777. The proposal was agreed to.

On Monday, the first sod of the new scheme of water supply for Arbroath was cut by Councillor Robertson, the Convener of the Water Committee. The scheme is estimated to cost £100,000. The Engineers are Messrs. Crouch and Hogg, of Glasgow. The ceremony of Monday took place in the neighbourhood of the ruined Castle of Melgund, about half-way between Arbroath and the intake at Glenogil. At its conclusion, luncheon, provided by Provost Alexander and other members of the Town Council, was served in the open air upon a lawn adjoining the ruined castle, after which the customary complimentary speeches were delivered.

CURRENT SALES OF GAS PRODUCTS.

Week ending April 8.

London makers still maintain their position in pitch, as they are remarkably well sold; and there is a very good prospect of better prices later on. Crude carbolic, 60 per cent., remains at or about 1s. 9½d.; while crystal carbolic acid, 39-40 per cent., varies from 6d. to 6¼d. per pound.

Ordinary London creosote for export has been sold at slightly better than 1⅜d. per gallon at makers' works.

Ninety per cent. benzol is rather quiet, with the price at from 8¾d. to 9d. per gallon. The demand for sulphate of ammonia has been very much better, and sales have been made at £12 12s. 6d. on Beckton terms; while at the close from £12 13s. 9d. to £12 15s., on the same terms, is asked. The pressure is for early delivery.

LIVERPOOL, *April* 8.

Sulphate of Ammonia.

The greater interest which began to appear a week ago has been sustained, more particularly for immediate delivery; and there has been a slight recovery in values, the closing quotations being £12 11s. 3d. per ton f.o.b. Hull, £12 13s. 9d. per ton f.o.b. Liverpool, and £12 15s. per ton f.o.b. Leith. There has not, however, been much disposition to operate over the near months, notwithstanding speculative offers at a discount on prompt prices. There has been considerable inquiry for summer-autumn months, but the ideas of buyers are not above £12 5s. per ton f.o.b.; and in the meantime makers do not see their way to accepting prices obtainable.

Nitrate of Soda.

Continental markets are very strong at the advance, and heavy deliveries continue to be made. United Kingdom demand has been fairly satisfactory; but sellers seem anxious to encourage larger business, and local prices have been reduced to 11s. and 11s. 3d. per cwt., according to quality.

LONDON, *April* 8.

Tar Products.

There has not been very much business doing, although the general tone of the market may be considered rather better. Some quantity of 90 per cent. benzol was placed at 8¾d. f.o.b. London for prompt shipment; but makers are reported to have declined this price for April-June. In 50-90 per cent., there is no business to report. Some small quantities were offering in the Manchester district; but the prices put forward by consumers did not result in business. The inquiry for toluol still continues very good. It is reported that business has been done at 7¾d., and there are now buyers at 8d. for prompt shipment. In solvent ordinary 90 per cent. at 160° is still very dull; but the special quality with a high flashing point is in good demand, and appears to be selling very freely, especiallyfor really first-class makers. The position of anthracene is still unchanged. Consumers appear

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perfectly indifferent as to the position of the article, and are evidently well supplied for some time to come; while the German manufacturers who produce a large quantity from coke-ovens are reported to have been arranging business with alizarine makers at very low prices for delivery over the present year. There is still a fairly good business doing in carbolic acid for April-June delivery at 1s. 9d.; and 1s. 9¼d. has been paid in several instances. London makers still ask, as a rule, 1s. 9⅜d. to 1s. 10d.; but consumers are not at present prepared to pay these prices, although it is highly probable that we may see this article a little firmer later on. In crystals, there is still a good inquiry for export, and there does not seem to be so much offering by dealers. Consequently the price is decidedly stiffer, as makers are not now particularly anxious to sell for early delivery. There is not very much business doing in creosote, and the article is rather quiet. So far as London is concerned, there are sellers at under the prices quoted by the largest makers; but consumers are not at all anxious to purchase. So far as America is concerned, there is a fairly good inquiry for forward delivery. The market in pitch is still very dull; and there is very little doing. The largest producers in London still ask 33s.; but dealers are willing to accept less than this price for early shipment, while for forward delivery it is very difficult indeed to fix the actual value. In Yorkshire, some small parcels have been sold for early shipment; but, unfortunately, there is still an absence of demand from Belgium, especially for early delivery. It is generally reported that the demand for briquettes on the Continent is very dull, and, consequently, makers are holding off the market, and in several instances are asking to have deliveries postponed. The Liverpool and Manchester district continues the weakest; and there is certainly a considerable quantity offering in this neighbourhood for early delivery.

The average values during the week were: **Tar**, 17s. 6d. to 21s. 6d. **Pitch, London**, 31s. 6d. to 31s. 9d.; **east coast**, 29s. 6d. to 30s.; **west coast**, 28s. 6d. **Benzol, 90 per cent.**, 8½d. to 9d.; **50-90 per cent.**, 7½d. **Toluol**, 7¾d. to 8d. **Crude naphtha**, 3d.; **solvent naphtha**, 8d. to 8¼d.; **heavy naphtha**, 9½d. to 10d. **Creosote, London**, 1⅝d. to 1 11/16d.; **North**, 1¼d. **Heavy oils**, 2d. to 2 1/16d. **Carbolic acid, 60 per cent.**, 1s. 9d. to 1s. 9½d. **Refined naphthalene**, £4 to £8; **salts**, 15s. to 17s. **Anthracene**, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market was decidedly quiet during the earlier part of the week, but closed with a firmer tone for prompt delivery. The Gaslight and Coke Company were willing to accept £12 12s. 6d., but have now raised their price to £12 15s. for immediate shipment. The South Metropolitan Company still quote £13; but no business is possible at the price even for prompt delivery. In Leith, makers still ask £12 15s. for prompt; but it is generally reported that dealers are accepting slightly under this for April delivery. Business in Hull was done early in the week at £12 10s., but later on £12 11s. 3d. was realized for immediate shipment; while it is reported that some business has been done for April-June at prices varying from £12 8s. 9d. to £12 10s.

COAL TRADE REPORTS.

Lancashire Coal Trade.

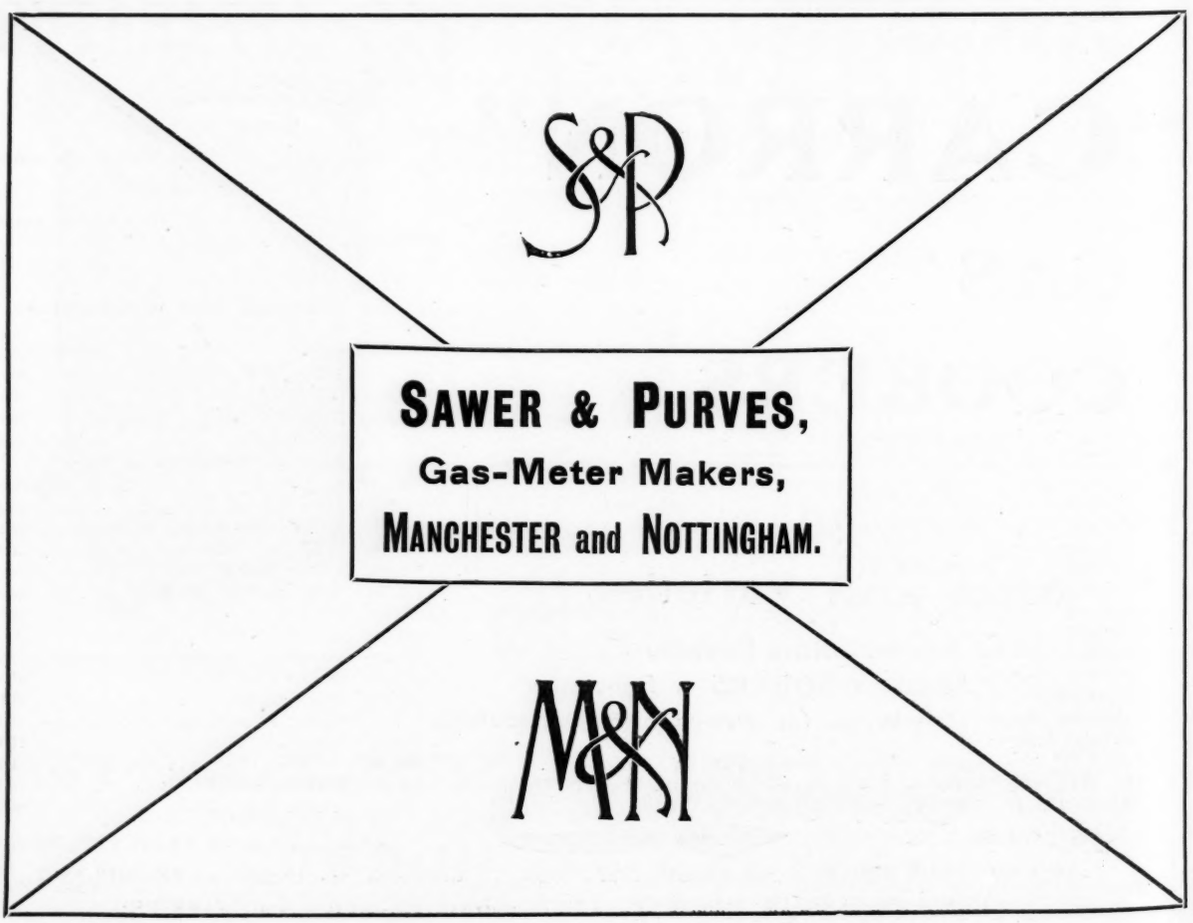
The limited demand for house coal has had the effect of causing some of the Lancashire collieries to limit the miners to four days' labour per week. The result of this is to make slack scarcer, and consequently dearer. Furnace coal is quiet. Engine fuel is in good request, with every prospect that the demand will be kept up for a considerable time to come. Prices are stiffening—making another advance not improbable. There is less inquiry for cannel. The orders for April are considerably below those for March, but still of a character which might be described as a fair April demand. Coal for shipping is in better demand. The quotations are: House coal, best, 13s. to 14s. per ton at the pits, secondary 11s. to 12s., common 9s. to 10s., best slack 7s. to 7s. 6d., medium 6s. to 6s. 9d., common 5s. to 5s. 9d., and engine fuel 7s. 6d. to 8s. 6d. Coke is steady, some contracts having been concluded at from 6d. to 1s. per ton advance.

Northern Coal Trade.

There is a rather better demand for coal for export; but the inquiry for home use shows the fall that is usual when the middle of April is near. The steam coal trade is fuller, and shipments to some of the Baltic ports are beginning; so that an enlargement of that part of the trade is to be expected. Best Northumbrian steams are steady at from 9s. to 9s. 3d. per ton f.o.b., second-class steams are about 8s. 3d. per ton, and steam smalls are from 4s. 9d. to 5s. 6d. per ton, f.o.b. In the gas coal trade, more of the large contracts are now settled; and while in a few cases there is a practical renewal of contracts at the old prices, in one of the large local companies the average of the new contracts is from 1½d. to 2d. per ton below that of those that were settled a year ago. Other contracts are in course of negotiation, and the prices are not expected to be much varied from those agreed upon. Some of the companies seem to be taking rather more of the cheaper classes of coal. Coke is steady; and the production of gas coke is now less, so that stocks may be expected to decrease. A little gas coke is still being delivered on old shipping contracts at good prices; but the current quotations seem easier.

Scotch Coal Trade.

Trade remains as it was; the demand being scarcely equal to the supply. Coal for shipment is still in poor request. There is no change in prices, which are quoted: Main 7s. 3d. to 7s. 6d. per ton f.o.b. Glasgow, ell 7s. 9d. to 8s. 9d., and splint 8s. 3d. to 8s. 9d. The shipments for the week amounted to 218,134 tons—an increase of 24,116 tons upon the previous week, but a decrease of 17,294 tons upon the corresponding week of last year. For the year to date, the total shipments have been 2,724,189 tons—an increase of 289,656 tons upon the same period of 1904.



TRADE NOTE.

Donkin and Clench's Exhausters.

Messrs. Bryan Donkin and Clench, Limited, have just been successful in obtaining the contract for the exhausters required for the new Poole works of the Bournemouth Gas and Water Company. Each exhauster is driven on the same combination base-plate by an electric motor through raw hide gearing. The plant consists of two exhausters, each to pass 70,000 cubic feet of gas per hour, and two others to pass 35,000 cubic feet per hour each. The firm have also obtained an order from the Briton Ferry Urban District Council for a small exhauster driven by a gas-engine, and one driven in the same way for the Goring-on-Thames Gas-Works. They have likewise received from the Bridgwater Gas Company an order for a 20,000 cubic feet per hour exhauster, driven by a steam-engine on the same base-plate.

Hitchin District Council and the Gas Company's Bill.—At the meeting of the Hitchin District Council last Wednesday, reference was made by the Chairman (Mr. Lawson Thompson) to the failure of the opposition, before the House of Commons Committee, to the Bill promoted by the Gas Company; and he expressed the indebtedness of the Council to several large ratepayers who were in readiness to give evidence as to the financial position of the town. It is believed that when the Bill reaches the House of Lords an effort will be made to insert a purchase clause in it.

Malvern Water Supply.—The ordinary meeting of the Malvern District Council last week was followed by a special one held to finally resolve upon proceeding with the Bill to sanction the carrying out of additional water-works. Major Hill moved the formal resolution, and it was seconded by Dr. Dixey, who urged that with the Bromesberrow scheme they would still have the British Camp reservoir, and when there was sufficient rain it would be the soft water for which Malvern was famed that would be in the reservoir. Mr. Hayes supported the motion, as no other solution of the difficulty had been put before the Council. In reply to a question, the Surveyor (Mr. W. O. Thorpe) said he did not know of a site for another reservoir. Mr. Heathfield said the total indebtedness of the Council was £34,368. The charge for the various loans was upwards of £2500, which was equivalent to a 6d. rate. After borrowing what sum was necessary for the new water scheme, and paying a 3d. rate for it, they would at the end of seven years (in 1912) pay a smaller rate, to the extent of 3d. in the pound, than was being paid now. They had to increase their capital 20 per cent. in order to supply the town and give their customers a plentiful supply of water; and they would increase their returns more than 20 per cent. It would be a foolish thing not to do this. After some remarks in opposition to the scheme, the motion was carried with two dissentients.

Tralee Gas Supply.—At the last monthly meeting of the Tralee District Council, the Gas Manager (Mr. J. E. Enright) reported that the total make of gas for the year ending March 31, 1904, was 19,697,930 cubic feet, and the quantity of coal carbonized 1975 tons, or an average of 9973 cubic feet per ton; whereas it was 20,571,920 cubic feet of gas, out of 2001 tons 10 cwt. of coal, or an average of 10,280 cubic feet per ton, for the year ending March 31, 1905.

New Water Supply at Saffron Walden.—The Mayor and members of the Saffron Walden Town Council, together with the officials of the borough, a few days ago attended the inauguration of the new water supply, which has been provided by the Corporation for the hamlet of Seward's End. The work, which has cost about £800, and will supply 5600 gallons of water per day (an average of 15 gallons per head of the population), has been privately subscribed for to the extent of about £400; the balance being paid by the Town Council.

Reductions in Price.—The Whittington Gas Company, Limited, have reduced the price of gas 2d. per 1000 cubic feet as from the commencement of the present quarter; and prepayment meter consumers will be repaid, from the contents of the money-box, 1d. for each complete 500 cubic feet of gas consumed. The Directors of the Aberystwyth Gas Company have resolved to reduce the price of gas from 4s. 3d. to 3s. 8d. per 1000 cubic feet from the 31st ult. The same charge will be made for whatever purpose the gas is used, and the new price will be subject to the discounts previously allowed to consumers who burn 30,000 cubic feet or more per quarter. The prepayment meters are to be altered as soon as possible, so as to afford 20 cubic feet for 1d. for all purposes. The Directors of the Melton Mowbray Gas Company have decided that from the 1st inst. the price for gas used for engines, as well as in factories for lighting, will be reduced 5d. per 1000 cubic feet; making the net price 3s.

Electricity v. Gas for Cromer Pier Pavilion.—At the meeting of the Cromer Protection Commissioners last Wednesday, they considered the question of lighting the pavilion on the pier. The Chairman (Mr. A. E. Jarvis) stated that the contract included a sum of £43 for gas-pipes and fixing, and also the placing of the fittings. They had received a tender from the Gas Company for supplying fittings, &c., for £43, making a total initial outlay of £86 for gas illumination. The Electricity Supply Company undertook to fit up an installation for £59 5s. He considered that electricity had much to commend acceptance of the Supply Company's tender, both as regards cleanliness and absence of heat. In the matter of the light, 3200-candle power electricity worked out at 10¼d. per hour, and 4000-candle power gas at 7¾d. per hour. Mr. Savin proposed the adoption of electric light. Mr. Lovelace said he favoured gas lighting. Mr. Rust said that, though a Director of the Gas Company, as a Commissioner he believed electric lighting was better than gas for the pavilion. The Chairman, as a shareholder in the Gas Company, agreed with the last speaker. Mr. Clarke moved as an amendment that gas lighting be adopted. This fell through for want of a seconder, and the motion was carried.

CARBURETTED WATER-GAS APPARATUS

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The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

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BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND IN ADDITION, 7,500,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

London County Council Expenditure.—At the meeting of the London County Council last Tuesday, the Finance Committee's estimate of expenditure of £250 by the Public Control Committee, under the Sale of Gas Acts, for the year 1905-6, was agreed to. The Council also sanctioned an outlay not exceeding £795 for the provision of incandescent gas-burners in various schools.

Teignmouth Gas-Works Finances.—A report on the financial position of the town was presented at a meeting of the Teignmouth District Council last Wednesday. Mr. F. Wheatley, in moving its adoption, said the gas-works were in a prosperous condition. In 1903 there was an adverse balance of £1283; but this incubus had been practically wiped off, and the Council could congratulate the Gas Manager (Mr. J. A. Gray) on this point.

Vagaries of the Electric Light at Newport (Mon.).—On Saturday, the 1st inst., there was a failure of the electric light, about nine o'clock in the evening, in the portion of Newport (Mon.) which contains the provision market. As the accident occurred just at the busiest time, the stall-holders were not only put to great inconvenience by having to provide themselves with other lights as quickly as possible, but had to keep a sharp look-out to prevent the loss of their goods, as many attempts at robbery were made. Investigation by the Borough Electrical Engineer (Mr. Collings Bishop) resulted in the discovery that a vulcanized high-tension joint of a cable had broken down. The defect was temporarily repaired as soon as possible after it was discovered, and the lights were restored just after midnight. It appears that this sort of thing is by no means uncommon at Newport; and the failure of the arc lamps, night after night, in the few main streets lighted by them, is naturally causing great dissatisfaction. In one main residential thoroughfare, which for the greater part of its length is lighted by electricity, the lamps were out altogether from Sunday, the 26th ult., till the following Wednesday.

Chard Corporation and the Gas-Works.—The question of the proposed loan for the purchase of the gas-works was again under consideration at a meeting of the Chard Town Council last Thursday. A report on the subject was presented by the Gas and Finance Committee. It recommended that the Town Clerk should ascertain from different bodies the terms on which they were prepared to lend the various sums required—viz., £44,000 for thirty years, £5300 for forty years, and £2000 for five years—or, in the alternative, the whole amount for a term of five years only. In the course of a discussion, it was stated that the figures named could not be taken as conclusive, the Council not having been able to ascertain the full costs of the proceedings. It was decided that Alderman Mitchell should have an interview with Sir E. Strachey, M.P., who represents the division in which Chard is situated, and lay before him the full facts of the case, and the desirability of an extension of the period for the repayment of the loans. Sir E. Strachey is to be asked to communicate with the President of the Local Government Board, and ascertain if he would be prepared to receive a deputation from the Town Council.

Danger of Loose Gas-Taps.—An inquest was held at Plymouth yesterday week on Edwin Johns, a naval pensioner, who died from gas poisoning. Deceased was found dead on his bed on the previous Saturday evening. The room was full of gas, and the tap of the bracket was turned on. A doctor who was called in said the tap was very loose, and the slightest touch would move it. He had previously suggested to deceased that it should be mended. A verdict of "Accidental death" was returned.

Bideford Water Supply.—In view of the continued deficiency in the quantity of water in store, the Bideford Town Council propose to enter into a permanent arrangement with the Northam District Council for an augmented supply. The District Council's mains pass through Bideford, and last summer they were connected with the Bideford mains in order to supplement the supply from the Corporation reservoir. It is now proposed to offer the Northam Council £100 per annum for a supply of water for seven years, the agreement to be determinable at the end of the third or fifth year by either party giving six months' notice; any quantity exceeding 4 million gallons to be paid for at the rate of 6d. per 1000 gallons.

Wolstanton District Council and the Chesterton Gas-Works.—At the last monthly meeting of the Wolstanton Urban District Council, the Clerk read a letter from the Chesterton Gas Company, accepting the Council's offer £2600 for the purchase of the works, subject to the consent of the Local Government Board being obtained and to an agreement being entered into. The Clerk further read a letter from Mr. Corbet Woodall, advising the Council that it would be necessary to apply for a loan of £5000, made up of £2600, the purchase-money, £200 for alterations at the works, and the balance for laying new mains, examining and relaying old ones, and providing meters, stoves, and fittings. The Clerk was instructed to prepare the necessary agreement, and to obtain sanction to the borrowing of a sum not exceeding £5000 for the purposes stated.

The Water Supply of Morley and Shelf.—The minutes of the Halifax Water Committee contain the following statement of an arrangement that has been made between the Halifax and Bradford Corporations with regard to the supply of water to Morley and Shelf. Bradford is to undertake the responsibility of supplying that portion of Lower Shelf within the limits of the Halifax area of supply, as defined by the Act of 1853; to pay the net cost of the outlay in respect of pipes already laid in the district by the Halifax Corporation; and to indemnify the latter from any claims or damages resulting therefrom. Whichever of the two Corporations next promote a Bill or Provisional Order in Parliament will secure a clause ratifying, if necessary, the above arrangement. The clause in the Morley Corporation Bill for the protection of the Bradford Corporation is to be approved by the Halifax Corporation. The Bradford Corporation are to waive their claim to a mandatory order and damages, and the Halifax Corporation are to pay the Bradford Corporation's London Agents' charges and Counsels' fees, but not the costs of Solicitors and witnesses.

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Hot Coke Fed to Producer.

WRITE FOR ESTIMATES.

PATENT "DWARF" INCLINED BENCH.

NEW CONVEYOR CO., LTD., SMETHWICK.

Scarborough Public Lighting.—At a meeting of the Sanitary and Lighting Committee of the Scarborough Corporation last Thursday, a report of the Lamps Sub-Committee dealing with street lighting was confirmed. It showed that the Sub-Committee had had under consideration the advisability of altering ordinary into incandescent lamps in the various wards of the borough, and had decided upon the conversion of a further 250 lamps. It was stated that the increased cost would be more than met by a reduction in the price of gas, so that there would be no additional burden on the rates—the Gas Company having given notice that the price of gas for public lighting would be reduced from the 1st of January last from 2s. 3d. to 2s. 1½d. per 1000 cubic feet.

Consolidated Water-Works Company of Rosario, Limited.—The report of the Directors of this Company for the year 1904 sets forth that the gross revenue, after making due provision for bad and doubtful debts, amounted to £49,327, and the working expenses to £20,423; leaving a balance of £28,904. After providing for debenture stock and other interest and income-tax, and placing £1000 to the depreciation fund and £2924 to the reserve fund (for redemption of capital), there remains an available balance of £16,675. On the 1st of November last, an interim dividend of 3 per cent. was paid on the preference shares. The Directors now recommend a further dividend on the preference shares (making the full preference dividend of 6 per cent. for the year) and a dividend of 5 per cent., tax free, on the ordinary shares; carrying £3079 to the credit of the ordinary share dividend account, which, with the existing sum of £3269 at the credit of this account, makes a total of £6348 to be carried forward. As the commencement of a sinking fund for the redemption of the 4 per cent. debenture stock, the Directors have cancelled the unissued balance of that stock, amounting to £5000, and since the closing of the accounts have purchased a further sum of £1000 for a like purpose. The new pumping plant, referred to in the last report, was brought into operation during the latter part of the year, and gives entire satisfaction.

The Stanton Iron-Works Company, Limited, have successfully tendered for 300 yards of 18-inch cast-iron pipes for the Gas Committee of the Salford Corporation, at £4 per ton.

The Rawmarsh Urban District Council have placed with Messrs. Robert Dempster and Sons, Limited, of Elland, a repeat order for Waddell's patent regenerators, which are to take the place of some generator-fired settings.

Of the 3116 fires which occurred in London last year, the cause of 367 was unknown. Among the remainder, 148 resulted from escapes of gas, 33 from seeking for escapes with a light, 171 from the upsetting of oil-lamps, and 218 from accidents with candles.

The Wigan Streets Committee have found the incandescent street lighting so satisfactory that they have decided to extend it to all the principal thoroughfares of the town. The work is to be carried out during the summer, so that the lighting may be ready for the early part of next winter.

Messrs. Joseph Taylor and Co. have obtained an order for one of their latest makes of 1½-inch solid plate lead saturators, including sulphate drainer and acid tank, for Messrs. Bird and Son, chemical manufacturers, of Cardiff. Also for a 1½-inch plate lead saturator with 2-inch bottom for the Batley Corporation Gas Department.

On the pretence of being a gas inspector, Henry Lancashire obtained admission to a house in Fennella Street, Manchester, from which he took jewellery valued at £16 10s. He was charged before the City Justices last Tuesday, and sentenced to four months' imprisonment with hard labour. He was sent for trial at the Assizes on other charges of robbery.

Mr. H. Maisner, the Managing Director of the Star Inverted Incandescent Burner Company, Limited, of 104 and 105, Great Saffron Hill, E.C., has been appointed the sole agent for the United Kingdom of the Export Gas Mantle Company, Limited, of Berlin. The Company, who are one of the largest makers of all descriptions of incandescent gas-mantles, make a speciality of manufacturing for factors only under their own trade mark.

The Pharos Light Syndicate, Limited, has been registered, with a capital of £1000, in £1 shares, to acquire and turn to account certain inventions, processes, patents, concessions, trade marks, &c., relating to the production, by atmospheric, electric, or other power, of compressed gas and machinery for compressing coal gas; and to manufacture and deal in electrical, gas, and other appliances, meters, and fittings, &c. There will be no initial public issue.

The Wright Gas Plant Manufacturing Company, Limited, has been registered, with a capital of £10,000, in £1 shares, to acquire the business of a gas engineer, gas plant and machinery merchant, &c., carried on as James Wright, at No. 181, Queen Victoria Street, E.C., and at Shipley Gate, Derbyshire, and to carry on the same, as well as the business of ironfounders, steel converters, heating, ventilating, and general engineers, gasholder makers, &c. There will be no initial public issue.

The recent gas exhibition at Southport has been a great success. Mr. J. Bond, the Gas Engineer, read a report to the Gas Committee last Tuesday, concluding with the expression "that there is no doubt that the results of the exhibition will prove a good source of revenue, through the sale of gas used both in lighting and heating." He announced that the following orders had been placed for gas-cookers at the hall during the exhibition: Hire-purchase, ordinary 31, slots 10; simple hire, ordinary 101, slots 247, total, 389.

Under the auspices of the Sheffield United Gas Company, an exhibition of gas cooking appliances by the Richmond Gas Stove and Meter Company, Limited, was opened in the Cutlers' Hall on Monday last week, and will continue till next Friday. There is a large assortment of gas-fires on view; and the Gas Company have a splendid display of fittings, comprising the most recent advances in incandescent lighting. Free cookery lectures are being given twice daily. It may be added, with reference to the Richmond Gas Stove and Meter Company, that they have lately exhibited, in conjunction with other makers, at Broughty Ferry, Pontefract, Rotherham, and Southport.

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To Gas Engineers and Secretaries . .

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Company Meeting.

IMPERIAL CONTINENTAL GAS ASSOCIATION. Cannon Street Hotel. May 2. 2.30 o'clock.

Plant, &c., for Sale.

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Stocks and Shares.

PORTSMOUTH WATER COMPANY. May 18.

TENDERS FOR

Carbon.

WOOLWICH GAS FACTORY. Tenders by May [illegible].

Chimneys (Jena).

DUBLIN CORPORATION. Tenders by April 28.

Coal and Cannel.

DARLINGTON GAS DEPARTMENT. Tenders by April 18.
MANCHESTER GAS DEPARTMENT. Tenders by May 10
WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Cocks, Main Taps, Valves, &c.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Exhauster and Engine.

COLWYN BAY AND COLWYN GAS DEPARTMENT. Tenders by April 22.
ROCHDALE GAS DEPARTMENT. Tenders by April 19.

Fire-Clay Goods.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

General Stores, Lead and Copper Tubs, Iron, Oils and Paints, &c.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Mantles.

DUBLIN CORPORATION. Tenders by April 28.

Meters (Gas and Water).

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Oil for Gas Making.

MANCHESTER GAS DEPARTMENT. Tenders by May 10.

Pipe Laying.

RHONDDA GAS AND WATER DEPARTMENT. Tenders by April 21.

Pipes, &c.

LEEDS GAS DEPARTMENT. Tenders by April 17.
RHONDDA GAS AND WATER DEPARTMENT. Tenders by April 21.
WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Retort Fittings.

LEEDS GAS DEPARTMENT. Tenders by April 17.

Sulphuric Acid.

BURY GAS DEPARTMENT. Tenders by April 17.

Tank (Water).

ROCHDALE GAS DEPARTMENT. Tenders by April 19.

Tar.

ULVERSTON GAS DEPARTMENT. Tenders by April 27.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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Resists 4500° Fahr. Best for GAS-WORKS.
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PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
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For all Ammonia Joints.

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SULPHATE PLANTS—See Advt. in last week's issue.
CHARGING MACHINERY—See Advt. in this week's issue.
EXHAUSTING MACHINERY—See Advt. in next week's issue.

PATENTS AND TRADE MARKS PUBLICATIONS, "MERCHANDISE MARK ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

GAS TAR and AMMONIACAL LIQUOR wanted by
GEORGE MILLER AND CO., Tar Distillers, 40, West Nile Street, GLASGOW.

ROBERT DEMPSTER & SONS, Ltd., Contractor for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

BANBURY GAS COMPANY.

MANAGER and Secretary for above. The Applicants (numbering 126) for this position, as advertised in the "JOURNAL," on March 7 and 14, are THANKED, and informed that the Vacancy has been FILLED.

GAS Manager (Age 33) desiring change, is open to engagement as MANAGER, or MANAGER and SECRETARY, of Gas-Works (10—30 Millions), or of Gas and Water Works. Excellent results in present position. Good References. Abstainer.
Address No. 4380, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as General ASSISTANT on a Gas-Works. Served articles with Gas Engineer and Manager. Good Carbonizer, Analyst, and Draughtsman, and a thorough all-round knowledge of the General Routine of a Gas-Works. Five Years' Experience. Salary moderate. Would make appointment.
Address No. 4371, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OUTDOOR SUPERINTENDENT.

AN Energetic, Tactful Man, Age 35, who has for the last Ten Years successfully Managed a small Gas Undertaking, will shortly be free and prepared to take over a post as above. Well up in Main and Service Laying, General Gas-Fitting, able to advise on all matters connected with uses of Gas, prepare Estimates, and able to take Sole Charge of the Distribution Department. Moderate Salary.
Address No. 4372, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LADY Lecturer wanted for Gas-Stove Exhibition.
Apply, by letter, stating Terms, &c., to No. 4381, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS Lighting Engineer required as REPRESENTATIVE for London and Southern Counties. One well known to the Trade and with some knowledge of Heating and Ventilating preferred.
Apply, by letter, giving full Particulars, to No. 4376, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WELLINGTON (SALOP) GAS COMPANY.

THE above Company require a thoroughly experienced MANAGER and ACCOUNTANT.
Salary £240, with Coal and Gas. No House.
Apply for full Particulars and Duties to R. A. NEWILL, Esq., Secretary, Gas Company, Wellington, SALOP.

ASSISTANT RETORT-HOUSE FOREMAN.

WANTED, for a Provincial Works, a competent and reliable Man. Age not to exceed 30.
Apply, by letter, stating Experience, Wages expected, and enclosing *copies* of Two good recent References, to No. 4377, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SHOW-ROOM ATTENDANT AND CLERK.

WANTED a man (not under 25) used to the business to act as above, and to receive payment of accounts, by a Suburban Company.
Apply, by letter, stating Age, Experience, Single or Married, Salary required, and when able to commence duties, to No. 4378, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Two or Three Travellers who have good connection, and have sold largely to Gas Companies.
Say locality best known in, Salary required, *copy* of References, and full Particulars.
To prevent disappointment, please do not apply if not been successful as Salesmen to Gas Companies. Connection not necessarily in Coal.
Address No. 4379, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

NEW Gasholder, 40 ft. diameter by 12 ft. deep, with Steel Standards; also new STEEL TANK to contain same.
Write J. WRIGHT, 181, Queen Victoria Street, LONDON, E.C.

REDDITCH GAS COMPANY.

PURIFIERS—Set of Four for Sale, 12 ft. by 12 ft. by 4 ft. 6 in. (faced joints), complete with Grids, Weck's Centre Valve, and 10-inch Connections. All in First-Class condition. Replacing with larger.
Particulars from ALBERT E. LAYTON, Manager.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

TEST PLANT FOR SALE—We have several small Sets of GAS APPARATUS suitable for Test Plants, including Retorts, Condensers, Scrubber, Purifiers, Gasholders, overhauled and guaranteed, or New throughout.
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

FOR Sale, cheap, a Wrought-Iron SCRUBBER, 20 ft. high by 3 ft. diameter, with 6-inch Valves and Connections.
COCKEY'S WASHER, to pass 100,000 cubic feet per diem., with 6-inch Valves and Connections.
Apply to SAML. WHILE AND SON, 60, QUEEN VICTORIA STREET, E.C.

PURIFIERS, &c., FOR SALE—Sets of 4 ft., 5 ft., 6 ft., 8 ft., 9 ft., 10 ft., 12 ft., 18 ft. squares; also 16 ft. by 12 ft., &c. SCRUBBERS, 8 ft. by 60 ft. 10 inch, 18 inch Square METERS. EXHAUSTERS up to 50,000 feet per hour in Stock. GASHOLDERS and TANKS, also New. State requirements
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

URBAN DISTRICT COUNCIL OF COLWYN BAY AND COLWYN.
(GAS DEPARTMENT.)

THE Chairman and Gas Committee of the above Council invite TENDERS for the supplying and fixing, at the Gas-Works, Colwyn Bay, of a STEAM-ENGINE and ROTARY EXHAUSTER combined, capable of passing 30,000 cubic feet of Gas per hour.
Full Particulars to be had by applying to J. C. Pennington, Gas Offices, Colwyn Bay.
Tenders, endorsed "Engine and Exhauster," to be addressed to John Williams, Esq., Chairman of the Gas Committee, on or before the 22nd of April, 1905.
JNO. C. PENNINGTON,
Engineer and Manager.

TENDERS FOR INCANDESCENT MANTLES AND JENA CHIMNEYS.

THE Corporation of Dublin are pre- pared to receive TENDERS for the supply of MANTLES and 6-inch JENA CHIMNEYS for Street Lighting, for the ensuing Year to the 31st of March, 1906.
Samples of at least Six of each to be forwarded to the Town Clerk, City Hall, Dublin.
The Tenders to be enclosed in a sealed envelope marked "Tender for Incandescent Goods," and addressed to the Chairman, Supplies Committee, City Hall, Dublin, and forwarded on or before the 28th inst.
By order,
HENRY CAMPBELL,
Town Clerk.
Town Clerk's Office, City Hall,
Dublin, April 6, 1905.

WALLASEY URBAN DISTRICT COUNCIL.
(GAS AND WATER DEPARTMENT.)

TO COLLIERY PROPRIETORS AND OTHERS.

THE Wallasey Urban District Council are prepared to receive TENDERS for the supply of about 5000 Tons of Round CANNEL and about 29,000 Tons of screened GAS COAL, delivered in accordance with the terms of the Specification prepared by, and obtainable at the Office of, Mr. J. H. Crowther, Dock Road, Seacombe.
Sealed Tenders, addressed to the undersigned and endorsed "Tender for Coal," Gas and Water Department, to be delivered per post, at my Office as below, not later than the morning of Thursday, the 20th of April, 1905.
The Contractor or Contractors will be required to enter into a bond, with approved sureties, for the due performance of his or their Contract.
The Council do not bind themselves to accept the lowest or any Offer.
By order,
H. W. COOK,
Clerk and Solicitor.
Public Offices, Egremont,
Cheshire, March 28, 1905.

WALLASEY URBAN DISTRICT COUNCIL.
(GAS AND WATER DEPARTMENT.)

CONTRACTS FOR STORES.

THE Wallasey Urban District Council are prepared to receive TENDERS to supply, for a period of Twelve Months from the 30th of June next, the following among other Articles; being the principal STORES required for use at their Gas and Water Works—viz.,

Wrought-Iron Tube.	Wrought-Iron Bars and Steel Plates.
Stop-Cocks and Main Taps.	Cast-Iron Main Pipes.
Lead Pipe, &c.	Oils and Paints.
Copper Tube, Sheets, &c.	Valves.
	Gas and Water Meters.
	Retorts and Fire-Bricks.

Further Particulars, with Form of Tender, may be had, and Samples inspected, on application at the Gas and Water Engineer's Office, Dock Road, Seacombe.
Sealed Tenders, which must be on the printed Form, endorsed "Tender for Gas and Water Stores," to be addressed to me and delivered (per post) at my Office as below, not later than the morning of Thursday, the 20th of April, 1905.
The Contractors will be required to enter into a bond, with approved sureties, for the due performance of their respective contracts.
The Council do not bind themselves to accept the lowest or any Offer.
By order,
H. W. COOK,
Clerk.
Public Offices, Egremont,
Cheshire, March 28, 1905.

COUNTY BOROUGH OF BURY.

TO SULPHURIC ACID MAKERS.

THE Gas Committee are prepared to re- ceive TENDERS for the supply of about 400 Tons of SULPHURIC ACID (for the Manufacture of Sulphate of Ammonia) for a period of One Year from the 1st day of May, 1905.
Form of Tender and Conditions may be obtained on application to Mr. H. Simmonds, Engineer and Manager, Gas-Works, Bury.
Sealed Tenders, endorsed "Tender for Acid," to be sent to the undersigned on or before Monday, the 17th inst.
JOHN HASLAM,
Town Clerk.
Municipal Offices, Bury,
April 7, 1905.

CORPORATION OF DARLINGTON.
(GAS-WORKS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Gas-Works Committee of the above Corporation invite TENDERS for the supply of 35,000 Tons of freshly-wrought GAS COAL, delivered at the Gas-Works Siding, as required, during the ensuing Twelve Months.
Further Particulars and Form of Tender may be obtained from Mr. Frank P. Tarratt, Gas-Works Engineer, Darlington.
Tenders, endorsed "Tender for Gas Coal," to be delivered at my Office, Houndgate, Darlington, not later than April 18, 1905.
No pledge is given that the lowest or any Tender will be accepted.
(Signed) H. G. STEAVENSON,
Town Clerk.
Town Clerk's Office,
Darlington, April 6, 1905.

LEEDS CORPORATION GAS-WORKS.

THE Gas Committee are prepared to receive TENDERS for the supply of CAST-IRON PIPES, RETORT CASTINGS, &c.
Samples may be seen on application at the Stores Department, 21, Dewsbury Road, and Form of Tender and Specification may be had on application to the undersigned.
Endorsed Tenders, addressed to the Chairman of the Gas Committee, Gas Offices, East Parade, Leeds, must be delivered not later than Monday, the 17th inst.
The Committee do not bind themselves to accept the lowest or any Tender.
R. H. TOWNSLEY,
General Manager.
Gas Offices, Leeds,
April 8, 1905.

MANCHESTER CORPORATION GAS-WORKS.

TENDERS FOR CANNEL, COAL, AND NUTS.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the supply of their requirements of CANNEL, screened COAL, and screened NUTS (unwashed), during One or Two Years at their Gaythorn, Rochdale Road, Bradford Road, and Droylsden Works, delivery to commence on the 1st day of August, 1905.
The Tender must state at what colliery the material offered is raised, and give the size of the mesh of the Screen over which it is passed, with the angle of inclination of the Screen.
Printed Forms of Tender may be obtained on application (in writing only) to Mr. Charles Nickson, Superintendent, Gas Department, Town Hall, Manchester, and Tenders, endorsed "Tender for Cannel, or Coal, or Nuts," as the case may be, must be delivered at the Gas Department, Town Hall, Manchester, before Ten o'clock on Wednesday morning, the 10th of May, addressed to the Chairman of the Gas Committee.
The Gas Committee do not bind themselves to accept any Tender, and reserve to themselves the right to divide any Offer as they may deem advisable.
By order,
WM. HENRY TALBOT,
Town Clerk.
Town Hall, Manchester,
April 7, 1905.

MANCHESTER CORPORATION GAS-WORKS.

TO OIL IMPORTERS AND OTHERS.

The Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the supply of OIL for the Manufacture of Carburetted Water Gas. The Oil to have a flashing point of not less than 73° (Abel's test), and not less than any higher degree of temperature which may be specified in any future Act of Parliament or regulations to be made thereunder.
Full Description, with Analysis of the Oil offered, must be submitted with each Tender, as well as a sealed sample of the same. The quantity of Oil to be delivered free of all Charges (including Ship Canal dues) into the storage tanks of the Corporation, at Trafford Wharf, on the banks of the Manchester Ship Canal, in such quantities as may be from time to time required by the Gas Committee, will be 10,000 to 15,000 tons during the Twelve Months ending the 30th of September, 1906.
Tenders to be at a price per imperial gallon.
Further Particulars may be obtained on application (in writing only) to Mr. Charles Nickson, Superintendent of the Gas Department.
Sealed Tenders and Samples, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gas Oil," must be delivered at the office of the Superintendent of the Gas Department, Town Hall, Manchester, on or before Wednesday, the 10th of May, 1905.
The Corporation do not bind themselves to accept the lowest or any Tender.
By Order of the Gas Committee.
WM. HENRY TALBOT,
Town Clerk.
Town Hall, Manchester,
April 7, 1905.

WAR DEPARTMENT CONTRACTS.

TENDERS are required for the Sale by the War Department of about 22 Tons of RETORT CARBON at the Gas Factory, Royal Arsenal, Woolwich, where it can be seen.

The Carbon will be loaded free into Trucks on the Royal Arsenal Railway Sidings, or in Barges alongside Royal Arsenal Wharves.

Forms of Tender will be issued on application to the Superintendent Building Works, Royal Arsenal, Woolwich, not later than Monday, the 1st day of May, 1905.

A. H. Bagnold, Colonel,
Supt. Building Works.

Royal Arsenal, Woolwich,
April 8, 1905.

ULVERSTON URBAN DISTRICT COUNCIL.

TO TAR DISTILLERS.

THE Gas and Water Committee are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works during the Year commencing July 1 next.

Further Information and Forms of Tender may be had on application to the undersigned.

Sealed Tenders, endorsed "Tender for Tar," and addressed to the Chairman of the Gas and Water Committee, to be sent in not later than the 27th inst.

The Committee do not bind themselves to accept the highest or any Tender.

Jno. Swan,
Engineer and Manager.

BOROUGH OF ROCHDALE.

TO MAKERS OF GAS EXHAUSTERS.

THE Gas and Electricity Committee of the above Corporation invite TENDERS for the supply, delivery, and erection, at their Gas-Works, of Two EXHAUSTERS, each capable of passing 80,000 cubic feet per hour, and each coupled direct to its own ENGINE.

Further Particulars may be obtained on application to Mr. T. Banbury Ball, the Manager at the Gas-Works, Dane Street.

Tenders, addressed to the Chairman of the Gas and Electricity Committee, and endorsed "Exhausters," must be sent in to me not later than noon on Wednesday, April 19, 1905.

By order,
Wm. Henry Hickson,
Town Clerk.

Town Hall, Rochdale,
April 7, 1905.

BOROUGH OF ROCHDALE.

TO IRONFOUNDERS AND OTHERS.

THE Gas and Electricity Committee of the above Corporation invite TENDERS for the supply and erection of a Cast-Iron WATER-TANK, about 55 ft. by 22 ft. 8 in. by 4 ft. 3 in deep, to be fixed on Wrought-Iron Joists about 18 feet above ground level.

Further Particulars may be obtained on application to Mr. T. Banbury Ball, the Manager at the Gas-Works, Dane Street.

Tenders, addressed to the Chairman of the Gas and Electricity Committee, and endorsed "Water-Tank," must be sent in to me not later than noon on Wednesday, April 19, 1905.

By order,
Wm. Henry Hickson,
Town Clerk.

Town Hall, Rochdale,
April 7, 1905.

RHONDDA URBAN DISTRICT COUNCIL.

(Gas and Water Department.)

THIS Council are prepared to receive TENDERS for the following—

1.—For the supply of about 9600 Yards of CAST-IRON, PIPES from 15 inches to 6 inches in diameter.

2.—For LAYING about 9600 Yards of CAST-IRON PIPES, from 15 inches to 6 inches in diameter.

Plans and Specifications may be seen, and Forms of Tender supplied, upon application to Mr. Octavius Thomas, the Engineer and Manager, Gas and Water Offices, Pentre, Glam., upon depositing the sum of One Guinea, which will be returned on receipt of a *bonâ-fide* Tender, but to be forfeited in the case of withdrawal of Tender after acceptance by the Council.

The Contractor will be required to pay the Standard Rate of Wages recognized in the district.

Tenders to be addressed to the Chairman of the Gas and Water Committee, endorsed "Tender for supplying Cast-Iron Pipes" or "Tender for Laying Cast-Iron Pipes," as the case may be, and delivered at my Office, on or before Ten a.m. on Friday, the 21st day of April, 1905.

The Council do not bind themselves to accept the lowest or any Tender.

Walter P. Nicholas, Clerk.

Council Offices, Pentre, Glam.,
April 4, 1905.

BOROUGH OF PORTSMOUTH WATER-WORKS COMPANY.

WATER ORDER, 1902,

THE Directors of the above Company Hereby Give Notice, that a SALE BY AUCTION of TWO THOUSAND NEW ORDINARY £5 SHARES in the above Company will, under, and in pursuance of, "The Borough of Portsmouth Water Order, 1902," take place at Messrs. Hall, Pain, and Goldsmith's Estate Sale Rooms, 57, Commercial Road, Portsmouth, on Thursday, the 18th day of May, 1905, at Seven o'clock in the evening.

The above Shares, which form part of the New Ordinary Capital authorized to be raised by the said Order, will be sold in Lots, of which the amounts and Particulars (together with the Conditions of Sale) will be duly announced.

Dated this 30th day of March, 1905.

By order of the Board of Directors,
J. L. Wilkinson,
Secretary to the Company.

Company's Offices, Commercial Road,
Portsmouth.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at Mr. Alfred Richards' Offices, 18, Finsbury Circus, E.C.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(Incorporated by Act of Parliament.)

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of Proprietors of this Association will be held at the City Terminus Hotel, Cannon Street, London, E.C., on Tuesday, the 2nd of May next, at 2.30 p.m. precisely, when a Report will be made to the Proprietors, a Dividend declared for the Half Year ended the 31st of December, 1904, and the usual Ordinary Business of such Meeting transacted.

Notice is Hereby also Given, that the CAPITAL STOCK TRANSFER BOOKS WILL BE CLOSED from the 18th inst. to the 2nd prox., both days inclusive.

The Dividend will be paid on the 9th of May.

By order of the Board,
Robert W. Wilson,
Secretary.

21, Austin Friars, London, E.C.,
April 10, 1905.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.

THE GRASSMOOR CO., Ld.,
CHESTERFIELD.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO
THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

THE
"ROTARY"
STATION METER.

Efficiency Demonstrated.

APPLY—
T. G. MARSH,
MAWSON CHAMBERS, DEANSGATE,
MANCHESTER.

RAILS.

New and Second-Hand with all Accessories; also Tip Waggons and Turntables.

B. M. RENTON,
MIDLAND WORKS,
SHEFFIELD.

Gas Companies are solicited to try Samples of the
MIRFIELD GAS COAL
UNEQUALLED.
Sperm Value 878·85 lbs. per Ton.

Prices and Analysis on application.

The MIRFIELD (GAS-COAL) COLLIERIES CO.,
RAVENSTHORPE, NEAR DEWSBURY.

JOHN HALL & CO.,
STOURBRIDGE,
Manufacturers of
FIRE-BRICKS, LUMPS, TILES,
GAS RETORTS,
And every description of Fire-Clay Goods.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

'BUFFALO' INJECTOR

Operated Entirely by One Handle
Class A lifts 24 ft.
Class B lifts 12 ft.
SEND FOR LIST.
Telegrams: "Temperature, London." Tel. No. 12,455 Central.
GREEN & BOULDING, — Limited, — 28, New Bridge St., LONDON, E.C.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
Note.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

THE WHOLESALE FITTINGS CO.,
80, COMMERCIAL ROAD, LONDON, E.
SEND FOR LIST.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER.
Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

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"IMPERIAL COOKERS."

178 per cent.
more Imperial Cookers sold in 1904 than in previous Year.

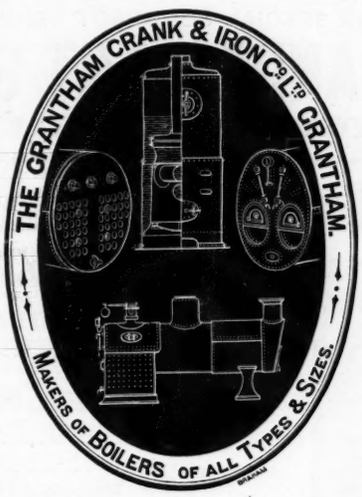
QUALITY WILL TELL.
COMPARE OUR PRICES.

OLD TOWN FOUNDRY, LEAMINGTON.

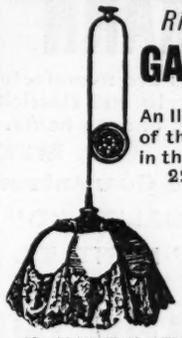
TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE LIMITED,
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 34, OLD BROAD STREET, E.C.



THE "HANWELL" PATENT
Rising and Falling
GAS PENDANT.



An Illustrated Description of this Pendant appeared in the "Journal" for Nov. 22, 1904 (page 599).

Write for full Particulars to the
"HANWELL" Pendant Company,
96, ABINGTON STREET, NORTHAMPTON.

THOMAS TURTON
AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
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S. S. STOTT & CO.,
ENGINEERS,
HASLINGDEN, near MANCHESTER.

LIME & OXIDE ELEVATORS & CONVEYORS.
COAL AND COKE STORAGE PLANTS.
Coal and Coke Elevators and Conveyors.
STAMPED AND RIVETTED STEEL ELEVATOR BUCKETS.
DETACHABLE CHAINS AND SPROCKET WHEELS.
HIGH-CLASS STEAM ENGINES. BEAM PUMPING-ENGINES, &c.

Now Ready, pp. 584 & XVI. 251 Illustrations. F'Cap. Quarto, Price 18s. net (Post Free).

THE SEVENTH EDITION OF
NEWBIGGING'S HANDBOOK
FOR GAS ENGINEERS AND MANAGERS
(DEDICATED TO SIR GEORGE LIVESEY).

The Work has been revised throughout, and contains 40 pages of Letterpress and 12 Illustrations more than the last Edition.

In almost every department additions have been made; and it is believed that the labour bestowed on its production will enhance the value of the book as a Work of Reference.

Orders may be sent through any Bookseller, or direct to the Publisher,
WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

BOWENS' Ltd. Successors,
STOURBRIDGE.

MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
ESTABLISHED 1860.

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The Flow of Gases & Proportioning Gas Mains

Four Diagrams (with Explanatory Pamphlet) for determining at a glance the various Problems involved in Proportioning Gas Mains and Services to suit the varying conditions of Diameter, Length, Pressure, Specific Gravity, and Discharge, with Notes as to the allowances to be made for Bends, Branch Mains, and other Disturbing Influences.

By F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E.

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BEST & LLOYD
Limited,
MAKERS OF THE BIRMINGHAM
PATENT "SURPRISE" PENDANT,
WITH PATENT SHADE.

OVER 50,000 NOW IN DAILY USE.

The ONLY GAS-PENDANT suitable for Domestic Lighting; a room 18 ft. by 14 ft. being beautifully illuminated with one Incandescent Burner.

Used in the private apartments of their
Majesties the King and Queen
at Sandringham.

BUHLMANN INCANDESCENT MANTLES.

These Mantles are manufactured by a Patent Process upon a specially prepared Ramie Base which gives great strength and elasticity and will be found under proper conditions to retain their lighting value for upwards of 2000 hours.

BRITISH MANUFACTURE.

All Mantles are Guaranteed—

SPECIAL QUALITY "C" MANTLES.

CLASS "B" MANTLES.

DUPLEX MANTLES.

TREBLE THREAD MANTLES.

No. 2, 3, and 4 KERNS.

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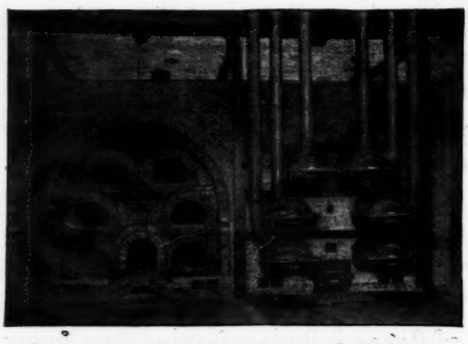

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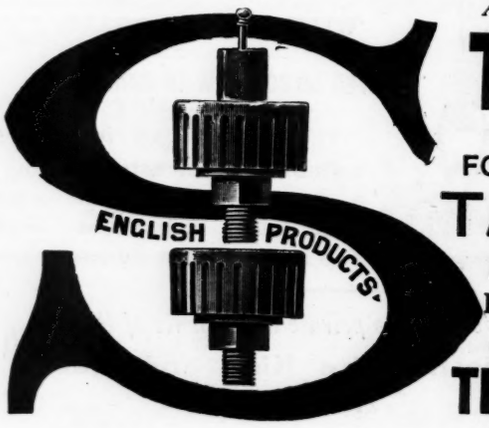

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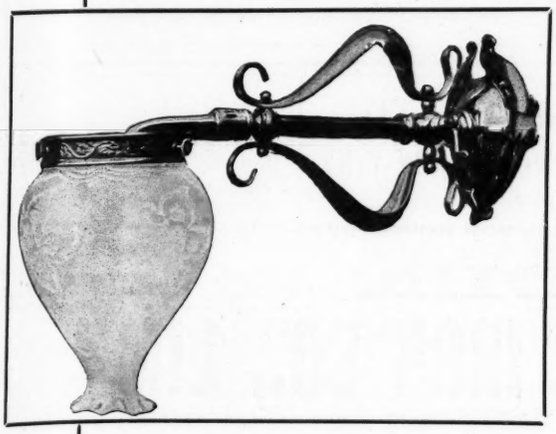

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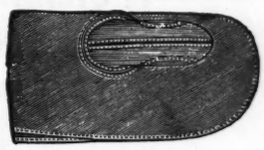

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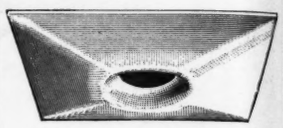

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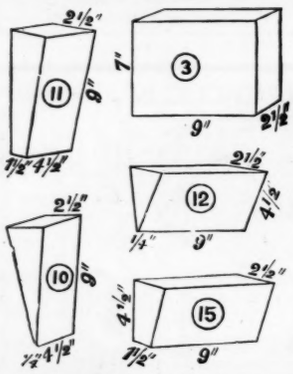

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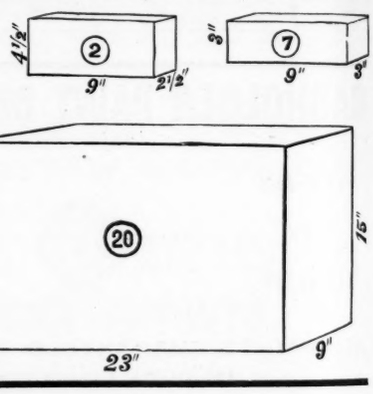

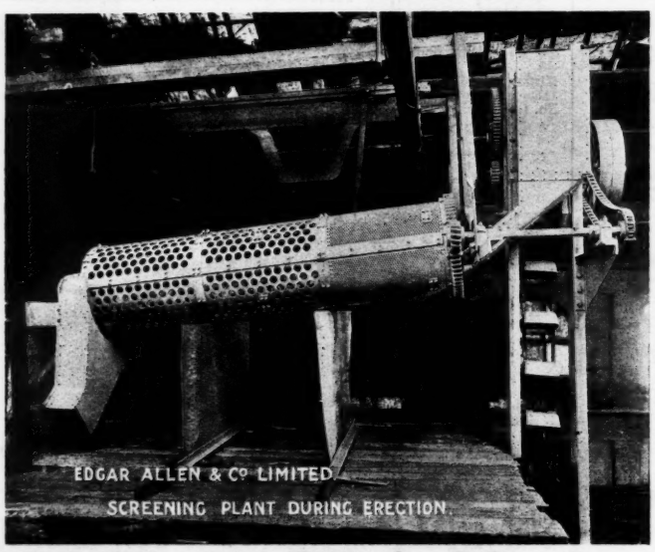

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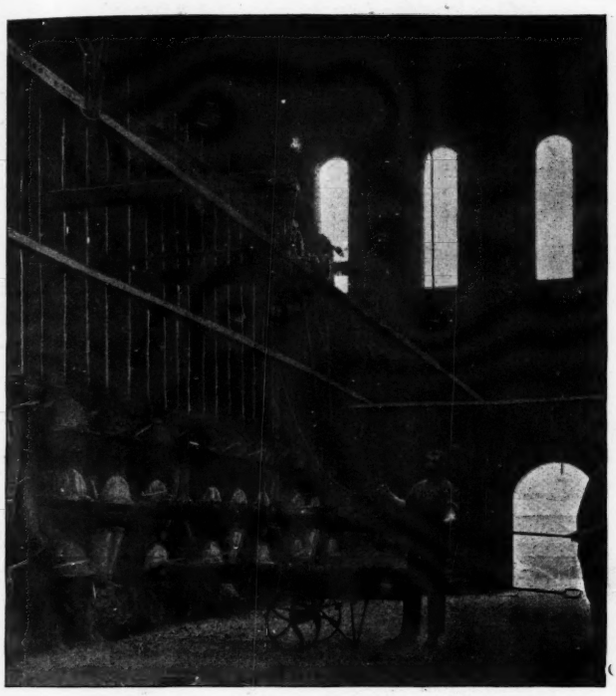

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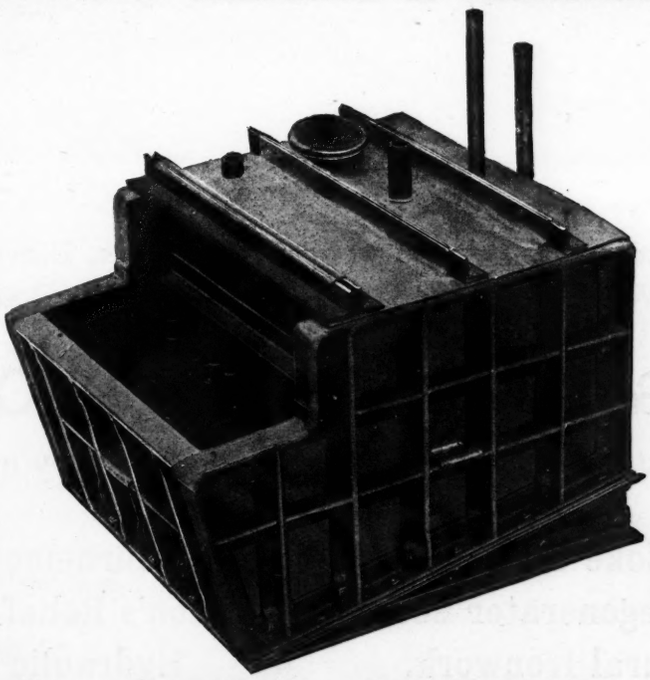

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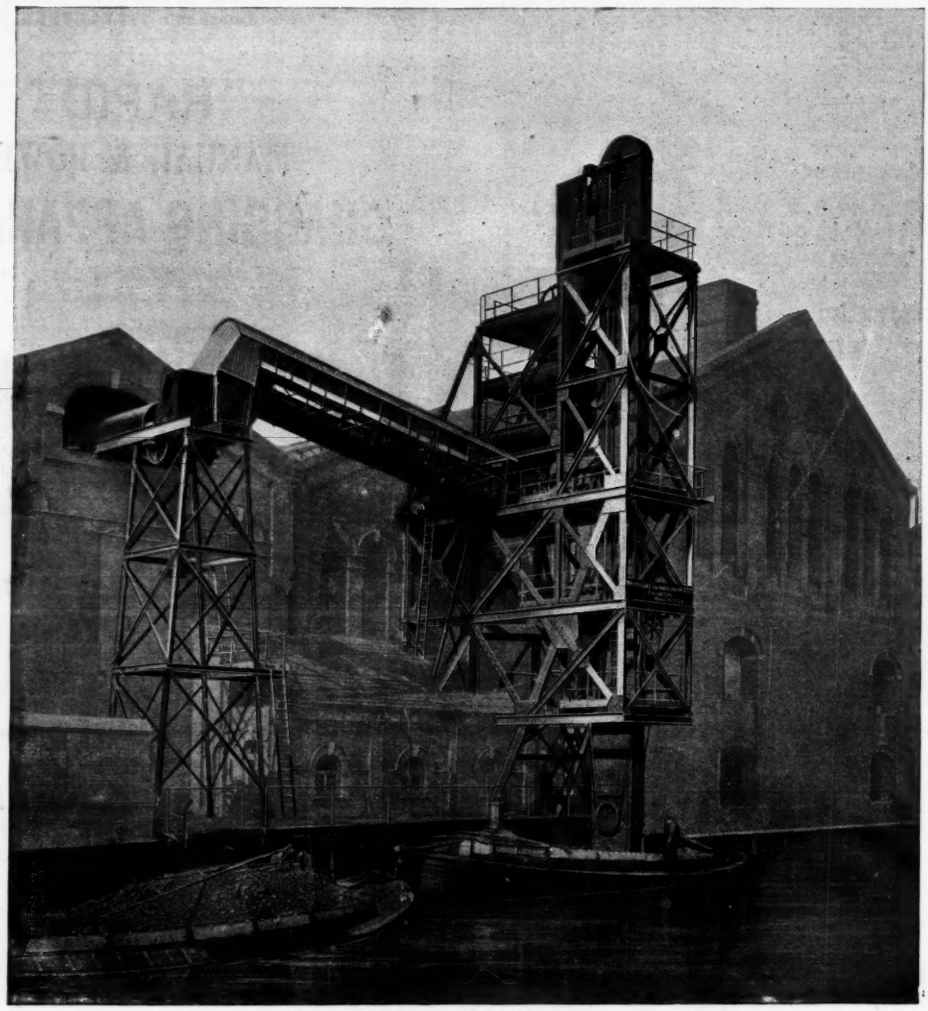

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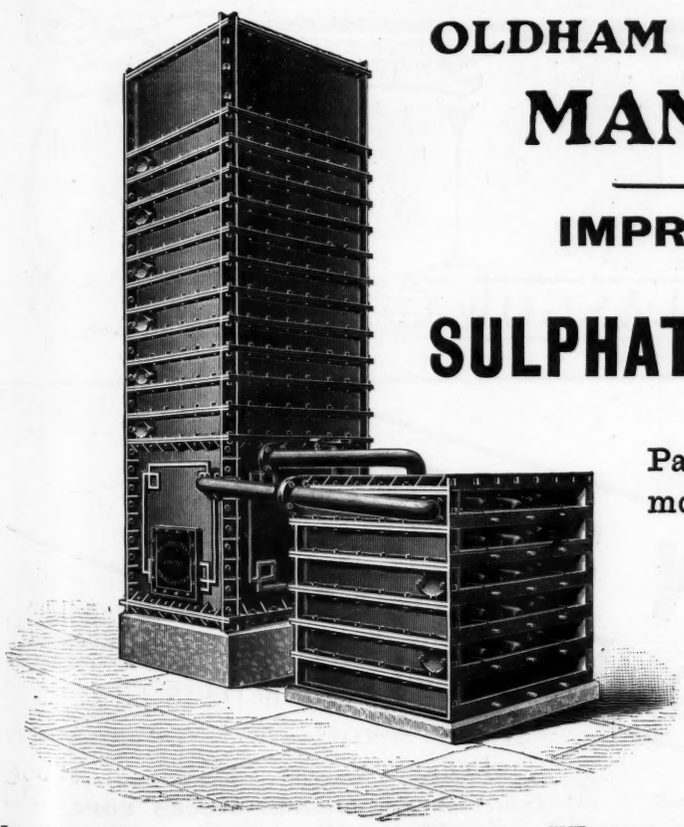

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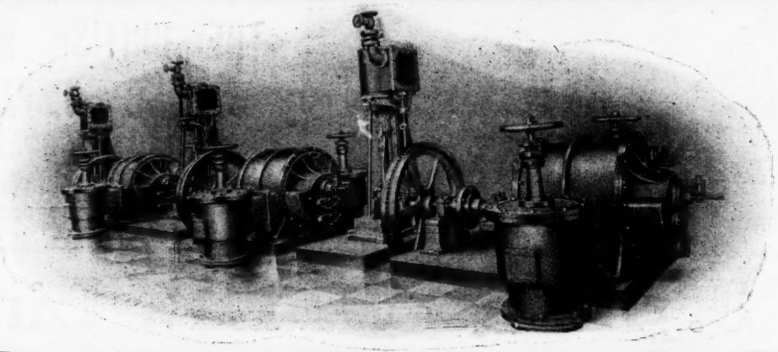

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